

Final Report

Evaluation of Extended Producer Responsibility for Consumer Packaging

Grocery Manufacturers Association

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EXECUTIVE SUMMARY

Introduction

Extended producer responsibility (EPR) is a policy approach that shifts the cost of managing post-use products, either partially or fully, from local governments to the producers of those products; some EPR laws require producers to physically manage their products at end-of-life as well. This report only uses the term EPR to refer to government laws or regulations that require producers to take on some measure of responsibility for their packaging materials or products at end-of-life. There is increasing debate in North America whether extended producer responsibility policies should be expanded to assist in progressing toward environmental objectives for products, packaging, and printed paper.

There are 63 existing legislated EPR laws/programs in U.S. states. All, except for one, of these existing laws apply to products with hazardous components, including products such as batteries, electronics, mercury containing devices, household hazardous wastes.¹ None currently applies to packaging and printed paper. Globally, however, packaging and printed paper EPR programs exist in over 35 non-U.S. locations including a few Canadian provinces, most European countries, and a couple of Asian countries. Because waste management is considered a local and state/provincial responsibility in the United States and Canada, there are no national-level EPR laws in either country and EPR decisions are made by individual states or provinces.

The purpose of this project was to evaluate whether legislated EPR policies are a preferred approach for meeting environmental objectives for consumer packaging in the United States. Because there are differences of opinion over the relative importance of differing environmental objectives and the extent to which cost should be considered in achieving them, it is expected that this report will better inform but not end the discussion over packaging EPR. Also, this report focuses on packaging and printed paper, and does not evaluate whether EPR may be appropriate for those products, mostly with hazardous components, that are more common targets for EPR.

Objectives of Packaging EPR

Advocates for EPR recite a large number of reasons why EPR should be considered a preferred policy approach for the end of life management for packaging and printed paper. These arguments ultimately condense into the following four assertions:

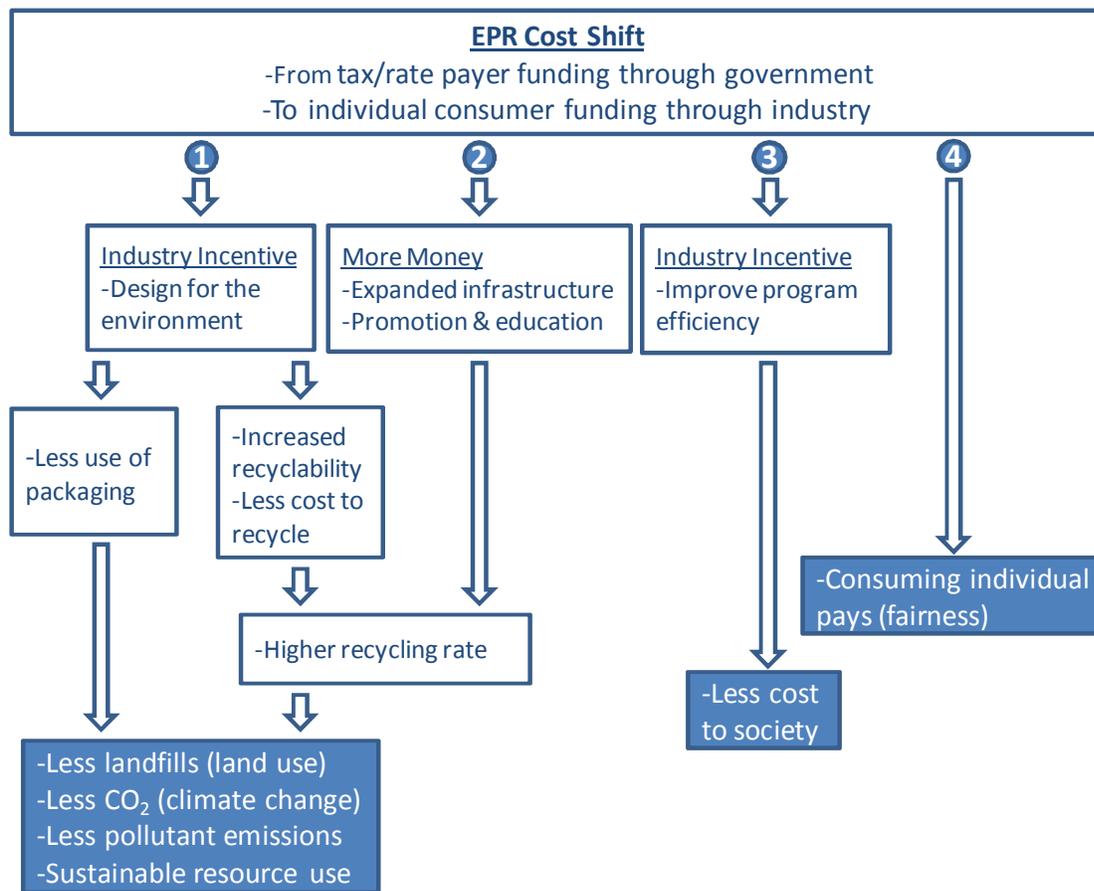
1. EPR causes producers to change packaging design and selection, leading to increased recyclability (higher recycling rates) and/or less packaging use.

¹ The one exception is California's EPR law for carpeting, which has a primary goal of diverting those products from landfills.

2. EPR provides additional funds for recycling programs, resulting in higher recycling rates.
3. EPR improves recycling program efficiency, leading to less cost, which provides a benefit to society.
4. EPR results in a fairer system of waste management in which individual consumers pay the cost of their own consumption, rather than general taxpayers.

Figure ES-1 illustrates the drivers, asserted effects, and aspired ultimate outcomes of EPR as articulated by EPR advocates. As the figure shows, EPR is considered an economic operator that principally works by shifting tax and rate payments for recycling away from government, and instead has individual consumers pay the cost of end-of-life management to industry.

**Figure ES-1
Asserted Effects and Outcomes of EPR**



According to EPR advocates, if EPR causes the effects illustrated in the figure, the ultimate outcomes shown in the shaded boxes will result. Therefore, this study examined program information and data to evaluate if EPR assertions are supported.

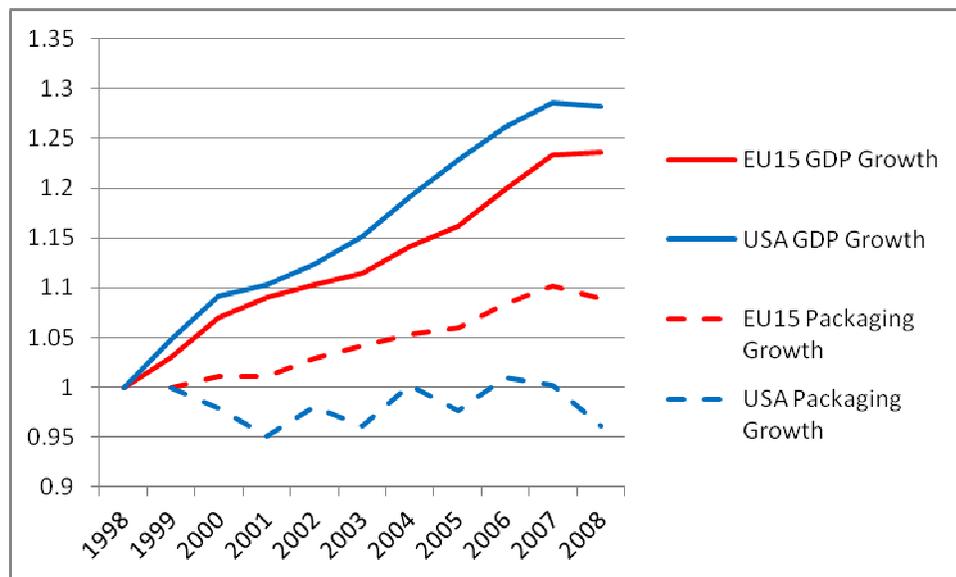
Evaluation of EPR

The primary arguments put forward by advocates for packaging EPR, at least in the United States, involve the first two assertions, which if proven true, would provide ultimate outcomes of less land use for landfilling, less emissions of carbon dioxide and other gases with global warming potential, less pollutant emissions, and more sustainable resource utilization. We address these first in the discussion that follows.

EPR's Influence on Package Design and Selection

With respect to the first assertion that EPR results in packaging changes by producers, advocates most often point to economy-wide data from Europe that on its face seems to indicate a “decoupling of packaging from gross domestic product growth.” We examined the same data set for the United States over the same period as that from Europe and placed both data sets on one graph. Figure ES-2 shows the result.

Figure ES-2
Comparison of Packaging Use to Gross Domestic Product



Source: SAIC, based on data from the U.S. Department of Commerce, U.S. EPA, and European Statistical Agency

This figure clearly shows that packaging use grew less in the U.S., where there is no packaging EPR, than in Europe, where there is packaging EPR, despite the fact that the U.S. had a higher gross domestic product (GDP) growth rate.

We also performed detailed packaging choice case studies for specific products (beverages, snacks, and ground coffee) in three locations where there is packaging EPR (Belgium, Germany, and Ontario). These case studies also demonstrated that EPR, at least for the package formats and jurisdictions investigated, does not provide a price signal that is sufficiently differentiated to cause producers to change package formats.

In conclusion, we found no evidence to support the assertion that EPR causes changes in package design or selection.

EPR's Influence on Achieving High Recycling Rates through Increased Funding

With respect to the second assertion we found that jurisdictions with EPR may achieve high recycling rates for the narrow portion of total discards covered by EPR (e.g., 62 percent of packaging is recycled in Europe; in the Canadian provinces of Manitoba, Ontario, and Quebec, residential-only packaging and paper recycling rates range from 65-68 percent). By comparison, the recycling rate for packaging in the United States in 2010 was 48 percent, and when printed paper is included (as in Canadian EPR), the packaging and paper recycling rate in the United States is 52 percent, across both residential and commercial sectors (analogous residential-only U.S. figures are not available). However, from a more comprehensive perspective that examines overall municipal solid waste recycling rates, the United States (where there is no packaging or paper EPR) performs just as well or better than Canada and Europe. The United States had a nationwide recycling rate of 24 percent in 2008, exceeding the recycling rates of Canada at 18 percent (where a majority of the population is covered by EPR), and the 27 European Union countries covered by packaging EPR, who recycled 23 percent of their municipal solid waste in 2008.

The European Community Landfill Directive requires that waste be processed prior to landfilling. Waste-to-energy is within the definition of processing, as are other activities to remove and divert products and materials before land disposal. In Austria, Belgium, Denmark, Germany, the Netherlands, and Sweden virtually no municipal solid waste goes to landfills and all such waste that has not been diverted for recycling is combusted, with further recovery of metallic recyclables (including steel and aluminum cans and packaging) from the post-burn ash. These countries report municipal solid waste landfill rates of less than five percent. Furthermore, many European countries impose waste disposal surcharges or taxes that are extremely high – an order of magnitude higher than similar surcharges in the United States – in order to support diversion of recyclables from disposal. These governmental waste policies and waste disposal infrastructures in Europe contribute strongly to the high recycling rates found there – a fact that is often not mentioned by those who seek to credit EPR for high recycling rates in certain European countries.

EPR's Influence on Enhanced Efficiency and Reduced Cost of Recycling Programs

The third assertion, occasionally made by advocates of EPR but not explicitly cited as an objective in EPR laws themselves, is that EPR will result in more efficient programs, ultimately saving consumers cost. By its nature, as a government mandate placed on industry, EPR results in three specific areas of cost increases that may not be offset by efficiency improvements. These three areas of cost increases are:

- Increased government cost increases to regulate producers, plus administrative cost increases accrued by producer responsibility organizations (i.e., costs associated with staff, administration, obtaining stakeholder input, registering companies, fee collection/payments, data gathering/monitoring, and reporting to prove compliance

with laws). The cost increases associated with government agencies and producer responsibility organizations ranged from 2.4 percent to 4.6 percent of total system cost for the EPR jurisdictions investigated in this study.

- Increased administrative costs (undocumented) accrued individually by regulated producers. Such costs include participating in stakeholder meetings, tracking and reporting quantities of regulated packaging, and calculating and remitting payments, for the over 35 global locations where there is packaging EPR. EPR obligations differ in each of these locations and the total administrative cost of becoming informed of and complying with requirements that is incurred individually by all obligated companies is not trivial.
- Increased taxation. Most locations in the United States have a state and/or local retail sales tax; however, services may not be taxed. When the cost of providing the recycling service is shifted from a municipal budget or untaxed utility bill and incorporated into the price of products that are subject to a retail sales tax, the effect is a tax increase to consumers. According to the Sales Tax Clearinghouse, average combined state and local sales taxes range from zero in Delaware, Montana, New Hampshire, and Oregon to 9.45 percent in Tennessee – the national average sales tax rate is 6.8 percent.²

Full cost data for recycling programs with EPR and without EPR is difficult to come by, generally not available, and certainly not directly comparable due to different basis of measurement and different currencies. The approach we took for this analysis was to perform in-depth analysis of several EPR programs and compare the results to a well-performing U.S. program not under EPR, making conversions to data as necessary to provide a nearly-equivalent basis for comparison. For this analysis, we investigated costs for the residential EPR program in Belgium, which is often cited by EPR proponents as a model, and the Canadian packaging and paper residential EPR programs in Manitoba, Ontario, and Quebec. The U.S. program we chose to profile was Ramsey County, Minnesota. Table ES-1 shows the results of this analysis.

Table ES-1
Summary of Program Cost and Performance for Residential Sector Programs

Jurisdiction	Start Date	Data Date	Total System Net Cost	Recovery	Net Cost (US \$/Ton) ¹
EPR Programs					
Belgium	EPR-1997	2009	Minimum net cost of €112.3 million ²	<ul style="list-style-type: none"> • 650,986 metric tonnes packaging • 83.5% per IVCIE • Plus an estimated 730,000 tonnes of residential paper not covered by EPR • 282 pounds per person 	Over \$98

² <https://thestc.com/FAQ.stm>

EXECUTIVE SUMMARY

Jurisdiction	Start Date	Data Date	Total System Net Cost	Recovery	Net Cost (US \$/Ton) ¹
Manitoba	EPR-4-2010	2010	Total annualized estimated cost of at least C\$13.7 million ³	<ul style="list-style-type: none"> • 72,667 metric tonnes (full year 2010 including 3 months of pre-EPR tonnes) • 67.6% (may not include tonnages in denominator for obligated stewards who did not report) • 130 pounds per person 	Over \$166
Ontario	EPR-2003	2010	Total cost of C\$203 million. ³	<ul style="list-style-type: none"> • 887,242 metric tonnes • 65% • 148 pounds per person 	\$202
Quebec	EPR-2005	2010	Total cost of at least C\$156.4 million ⁴	<ul style="list-style-type: none"> • 2008 quantity of 608,000 metric tonnes minus 91,000 commercial tonnes • 64.8% • 147 pounds per person 	Not available
Non-EPR Comparison					
Ramsey County, Minnesota	No EPR	2011	US \$6.5 million net municipal cost	<ul style="list-style-type: none"> • 41,679 short tons • 164 pounds per person 	\$156

¹ Based on a conversion factor of 0.907 short tons per metric tonne, and average 2010 currency conversion factors of 1.328 U.S. dollars per Euros and 0.971 U.S. Dollars per Canadian dollar. Note that net costs can vary significantly from year-to-year due to market fluctuations for the value of recovered materials.

² Includes €119.1 million for the Fost Plus EPR program, €0.5 million for governmental regulatory costs (allocation of half of IVCIE costs to residential packaging), and a minimum estimate of €28 million municipal cost for paper recycling (not covered by EPR but included to allow equivalent comparisons) minus packaging and municipal paper revenues of €35.3 million.

³ Based on C\$8.7 million first year expenditures for Multi-material Stewardship Manitoba (includes C\$6.8 million paid to municipalities for 3/4 year, net of materials revenues) and CBCRA expenditures of C\$1.8 million March 26, 2010-Dec. 2010. Costs were annualized and municipal costs were estimated by way of extrapolation from the 80 percent industry cost share reported (actual total net costs may be higher).

³ Derived from "2010 Financial Datacall Residential Blue Box System," Waste Diversion Ontario, December 14, 2011.

⁴ C\$138.3 million net municipal cost plus, plus municipal administrative allowance of C\$10.8 plus C\$7.3 million for RECYC-QUEBEC, Recycle Médias, and EEQ administration costs.

As Table ES-1 shows, we found that Belgian recycling systems under EPR are cost-effective, although there are social/geographic factors (such as high population density), waste policy factors, and waste infrastructure factors (such as a robust waste-to-energy system) that may make the cost-effectiveness of EPR in Belgium unique and not applicable to the typical U.S. state. Unlike the Belgian experience, packaging and paper EPR in the Canadian provinces that have EPR has proven to be expensive. SAIC considers the experience in Canada to be much more applicable to what the cost-effectiveness in U.S. states may be, rather than that of Belgium, due to the similarity of the two countries.

For the case study jurisdictions examined by this study, especially those in Canada that are most applicable to the United States, it does not appear that EPR has reduced system cost.

Fairness of EPR

The fourth assertion is that EPR is inherently fairer than the standard approach of financing the cost of residential packaging and paper recycling programs in the United States through utility bills, or in some jurisdictions, taxes. This assertion is true, although some non-EPR policies, such as pay-as-you-throw, can provide the same

outcome (individual consumers pay the cost of their own consumption) more comprehensively across all discard types without the cost associated with EPR.

Conclusions

The crux of the debate over EPR is how cost-effective it is in compared to non-EPR alternatives. This quote from the Harvard Environmental Law Review provides excellent perspective:

To be comprehensive, any cost-benefit analysis of EPR should include resource benefits (avoided energy inputs and avoided virgin material use), but doing so is enormously complex. If EPR programs avoid deforestation, mining, petroleum refining, air pollution, or greenhouse gas emissions that would have otherwise preceded production of new products, how should those benefits be quantified?

Even if such benefits could be quantified, it should also be recognized that any policy instrument that stimulates recycling or subsidizes use of secondary materials could accomplish many of the same results. In other words, the issue of whether the European Union or the United States should do more to encourage recycling is quite distinct from the issue of who should pay.³

People ultimately pay for the end-of-life management of packaging and paper, whether through a utility bill not under EPR or through costs embedded into the price of products under EPR, not governments or producers. Furthermore, government policies are central to achieving high recycling rate goals, since only governments can require and implement policies such as landfill bans, disposal surcharges, and other supporting policies, whereas industry, even if in full control of recycling programs under EPR, lacks the legal authority to implement such policies.

This study found that U.S. communities and states that have instituted non-EPR policies can achieve high recycling rates within a reasonable cost, addressing more comprehensive portions of the waste stream than narrowly focused EPR laws that only address packaging and printed paper, often only from the residential sector. For example, this study profiles Ramsey County Minnesota with its 47 percent overall recycling rate (55 percent including yard waste), which was achieved at a net cost of \$156 per ton for residential packaging and paper recycling. Example states that have made extensive use of policies to achieve high overall MSW recycling rates include Minnesota at 43 percent, and California with a reported landfill diversion rate of 65 percent.

³ “Planning the Funeral at the Birth: Extended Producer Responsibility in the European Union and the United States,” Harvard Environmental Law Review, August 2006.

Section 1

EXTENDED PRODUCER RESPONSIBILITY OBJECTIVES

This section:

- Includes a definition of extended producer responsibility;
- Provides a tabulation of where consumer packaging is covered by EPR legislation in Canadian provinces and European countries; and
- Explains why some people advocate for EPR for consumer packaging.

What is Extended Producer Responsibility?

Individuals use terms for the involvement of producers⁴ in the end-of-life management of products and packaging in different ways, so it is important to clarify terms. In this document, we use this definition for extended producer responsibility:

Extended producer responsibility is an environmental policy approach in which a producer's responsibility, physical and/or financial, for a product is extended to the post-consumer stage of a product's life cycle. There are two key features of EPR policy: (1) the shifting of responsibility upstream to the producer and away from municipalities, and (2) to provide incentives to producers to take environmental considerations into the design of the product.⁵

In March of 2012 the Product Policy Institute, Product Stewardship Institute, and California Product Stewardship Council released a joint document "Product Stewardship and Extended Producer Responsibility: Definitions and Principles" to also clarify terms. Although there are some differences between their new definition and the one used in this report, they incorporated the word "mandatory" into their definition of EPR. This is an important clarification and one we fully agree with. Therefore, in this report the term EPR will only be used to refer to instances where a government has instituted a law or regulation that mandates producers share in some way in the responsibility of end-of-life management of packaging. Alternatively, we use the term "voluntary product stewardship" to refer more generally to instances where producers may operate voluntary end-of-life management programs for their products or packaging.

There are end-of-life management programs or financing approaches, driven by legislation, that technically meet the definition of EPR as provided above, but that most people do not commonly consider EPR. In this document, we also will exclude

⁴ Producers are normally considered those who design the product or package, or are a first importer in the case of goods that come from outside a state, province, or country where there is an EPR law or regulation.

⁵ This is the most common definition for EPR and comes from the Organization for Economic Cooperation and Development (OECD).

these types of programs and funding mechanisms from our discussion of EPR. An example of such programs are beverage container deposit-return systems mandated by law in ten U.S. states and eight Canadian provinces. Although deposit-return systems may technically meet the definition of EPR – legislated programs where producers typically fund the cost of operating the systems for selected packages (beverage containers), and additionally may physically take back empty beverage containers – most individuals prefer to discuss deposit-return systems separately from other EPR systems.

Summary of Packaging EPR Programs

Following is a list of where EPR is mandated for packaging in Canada and Europe. There are a few other packaging EPR laws in other parts of the world (e.g., Japan), but they are not covered in this report due to the pronounced differences of those countries compared to the United States. As of the date of this report, there were no EPR programs for packaging in the United States.⁶

- Canada
 - British Columbia (under development and planned for a May 2014 implementation, but not implemented at the time of this report) – will start with residential consumer packaging and printed paper and later expand to the industrial, commercial, and institutional (ICI) sector.
 - Manitoba – consumer packaging and printed paper (at-home and carry-out food/beverage packaging – excludes other industrial, commercial, and institutional packaging/paper).
 - Ontario – residential consumer packaging and printed paper.
 - Quebec – residential consumer packaging and printed paper.
- Europe
 - Croatia.
 - European Union member countries (22), including Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Estonia, France, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.
 - Iceland.
 - Finland.
 - Macedonia.
 - Norway.
 - Serbia.

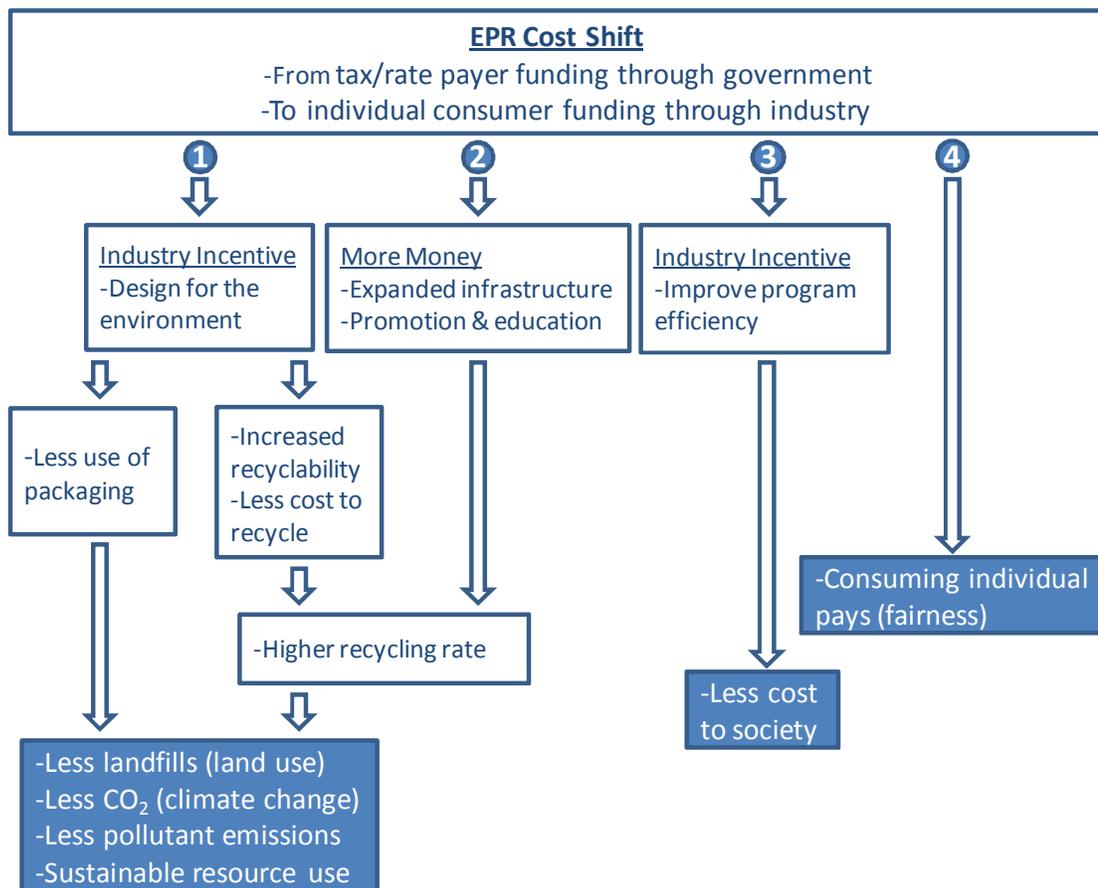
⁶ While there are no packaging EPR laws in the United States, there are 63 existing legislated EPR laws/programs for products with hazardous components, including products such as batteries, electronics, mercury containing devices, and household hazardous wastes.

- Switzerland.
- Turkey.
- Ukraine.
- United Kingdom.

Why the Push to Expand EPR to Packaging

A growing number of advocacy groups, government agencies, and certain consumer products companies are calling for EPR for packaging and printed paper in the United States. These groups claim that EPR best provides certain desired ultimate outcomes, and the desired outcomes arise because EPR causes certain effects. Figure 1-1 illustrates the most commonly asserted causes and effects (unshaded boxes and arrows), and ultimate outcomes (shaded boxes) from EPR.

**Figure 1-1
Asserted Effects and Outcomes of EPR**



Proponents of packaging EPR assert that EPR works as an economic policy approach that shifts end-of-life management costs of products and packaging from being paid by general tax or rate payers to government, to individual consumers paying the cost to industry. This cost shift has several effects, including:

- More money. Consumers, businesses, and cash-strapped local governments are often not willing or able to incur more cost to achieve higher recycling rates when disposal may be less costly. Shifting some or all of the costs of achieving higher recycling rates to producers (and ultimately the consumers of those specific products) can provide additional sustained funding for expanded and more comprehensive recovery systems, more effective promotion of recycling programs, and better education of program participants. The assertion is that spending more money will result in higher recycling rates.
- Package redesign for the environment. EPR can send a price signal (industry incentive) back to producers, providing additional financial incentives to design for the environment. Advocates of EPR assert that the price signals cause producers to choose packaging that can be recycled over alternative packaging that cannot, or choose packaging that is less costly to recycle, both of which will result in higher recycling rates. Advocates of EPR also assert that the price signals result in less use of packaging.

The ultimate outcomes that are asserted to come from the above effects of EPR are:

- Less landfills, which preserves land for other uses (plus less use of land for mining/forestry).
- Less emissions of CO₂ and other gasses with global warming potential, which can mitigate climate change.
- Less pollutant emissions compared to virgin materials production processes and waste disposal operations.
- More sustainable use of resources (consideration of future generations), including a shift to the use of renewable resources.

Advocates of EPR also assert that such policies can result in the transfer of recycling program design and operational control from government to industry, resulting in more efficient recycling programs. More efficient programs provide an ultimate outcome of a reduced cost to society.

Finally, under EPR an ultimate outcome is directly produced because consumers and producers pay end-of-life management costs for the products they consume/produce, rather than spreading the cost burden equally over all taxpayers or all ratepayers. This is called the polluter pays principle and is considered fair.

The remainder of this section presents a brief description of voluntary product stewardship initiatives and programs for packaging. The following sections of the report are devoted to investigating how EPR compares to other approaches in terms of meeting the ultimate outcomes or objectives that were identified above.

Voluntary Product Stewardship

A number of producers of consumer packaged goods are globally active in expanding the recycling of packaging. A few select example initiatives focused on North America, by no means comprehensive, include:

- The Coca-Cola Company, which has provided grants for at least five years for beverage container collection bins at away-from-home and college and university collection points. Coca-Cola also actively provides recycling education and outreach, including a fleet of five education vehicles that visit venues and events.
- PepsiCo, which sponsors a “Dream Machine Recycling Initiative” to collect beverage containers at away-from-home locations. Since this program began in April 2010, some 93,909,482 plastic bottles and aluminum cans were recovered from the 4,000 Dream Machine bins and kiosks placed at colleges, grocery stores, shopping malls, gas stations, offices, government facilities and other locations throughout the U.S.⁷
- Target Stores, which accepts from the public cans, glass containers, plastic bottles, and plastic bags at each of its stores for recycling.
- U.S. grocery and large retail stores, which accept plastic bags and clean polyethylene packaging film for recycling at over 12,000 collection locations.
- The British Columbia Dairy Council. Beverage containers in the Canadian province of British Columbia carry deposits and are collected through an industry-managed deposit-return system. Dairy bottles, however, are exempt from the deposit program. Since 2006, the British Columbia Dairy Council has operated a voluntary product stewardship program for dairy containers. Consumers can bring empty containers to nearly 160 deposit-return locations for recycling (no deposits are refunded since none were charged) and can recycle them in some municipal curbside recycling programs as well. There is also an active program to collect and recycle milk containers from schools and other institutions. The cost of the industry’s voluntary recycling programs is incorporated into the price of the products sold. A similar program, called the Unified Dairy Recycling System, is operated in the Canadian province of Saskatchewan.
- Action to Accelerate Recycling is an initiative that was begun by Alcoa Inc. and a number of other private companies in the spring of 2012 to investigate ways that industry can voluntarily assist in recovering more packaging in the United States. It is not yet known what affect this organization will have on the recovery of more packaging or printed paper.

Although this report is focused on evaluating EPR, and a discussion of voluntary industry product stewardship programs has been limited to this brief discussion, it is important to note that voluntary product stewardship initiatives have many of the same elements that EPR advocates cite as reasons for legislated EPR programs. Specifically, they expand collection infrastructure and include promotion and education messaging to consumers, both of which result in higher recycling rates. They also internalize the costs that companies incur for the initiatives in the prices of products sold.

⁷ “PepsiCo Dream Machine Recycling Initiative – Two Years in Review,” PepsiCo, April 2012.

Section 2

EPR'S INFLUENCE ON PACKAGE SELECTION AND DESIGN

Introduction

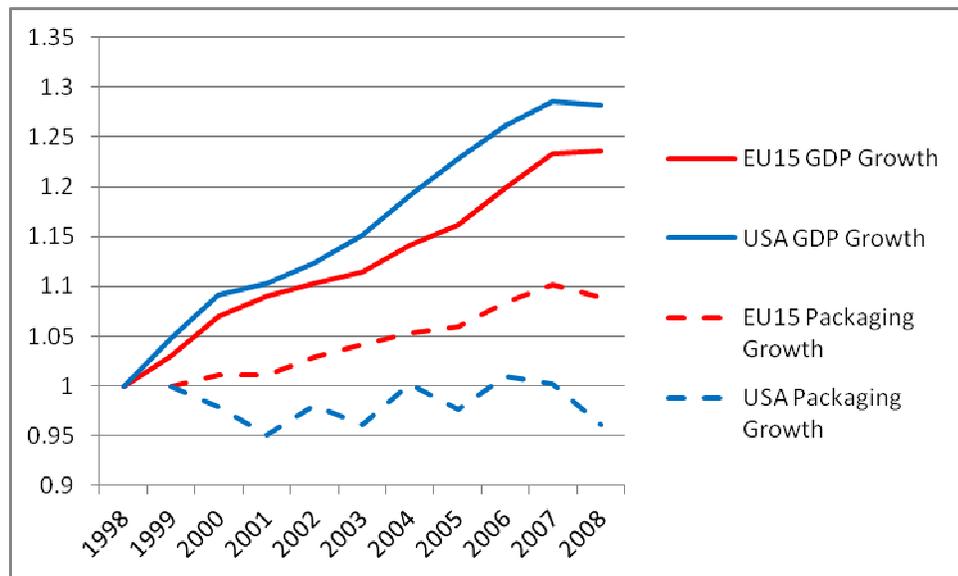
The prior section articulated general reasons why some people advocate for packaging EPR. This section critically evaluates whether evidence supports the assertion that EPR causes consumer packaged goods companies to change their packaging.

Changes in Economy-wide Packaging Use over Time

Advocates for EPR frequently present a graph of gross domestic product (GDP) in the European Union – 15 countries (EU15), versus the quantity of packaging placed on the market in those countries over time, as support for their argument that EPR has slowed packaging growth.⁸ The graph of European data shown does depict a slowing of packaging use compared to GDP over the same period. EPR advocates claim the graph demonstrates that EPR “has resulted in a decoupling” of packaging from GDP.

SAIC obtained the same type of information for the United States and placed it on the same graph that EPR advocates show for Europe in order to compare the results. This graph is shown below as Figure 2-1.

Figure 2-1
Comparison of Packaging Use to Gross Domestic Product



Source: SAIC, based on data from the U.S. Department of Commerce, U.S. EPA, and European Statistical Agency

⁸ EU-15 area countries are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom.

Figure 2-1 clearly shows that economy-wide packaging use has remained flat and even declined slightly in the United States, whereas the GDP growth in the United States exceeded that of the EU15 countries. In other words, there has been less packaging growth in the United States, which does not have packaging EPR, than in Europe, where there is packaging EPR. This result is opposite what EPR advocates assert and calls into question whether EPR has had any effect on package design and selection.

Case Studies

An economy may have thousands of package types and formats for delivering products to consumers. In addition to the economy-wide analysis presented above for all packaging, SAIC collaborated with Packaging & Technology Integrated Solutions, a division of HAVI Global Solutions Direct, LLC (PTIS), to investigate how EPR could potentially influence package choices for a limited number of very specific case study examples. PTIS performed this analysis for a beverage container example, a snack example, and a ground coffee example, with at least three packaging choices for each example. The evaluation compared the level of EPR price signals for each example in Germany, Belgium, and Ontario to the cost of the different package formats and the overall price of the contained products.

Key findings of the case study analysis for the product types, package formats, and countries evaluated were:

- EPR fees as a percentage of retail product price in Ontario and Belgium ranged from 0.01 to 2.80 percent of total product price. Fees in Germany were significantly higher, ranging up to 12.6 percent of the product price (in most cases fees in Germany were two to six times higher than for similar packaging in the other countries evaluated).⁹
- The differential in package format fees does not provide a price signal to consumer packaged goods companies to switch from one package format to another – EPR simply increases packaging costs to manufacturers across all package formats.
- Consumer packaged goods companies' selection of one material/package format over another is driven by a broad array of considerations including consumer package preference, logistics costs (i.e., cube utilization during distribution), and retail shelf space utilization.
- Package formats can change quickly based on new material and equipment technology and consumer/marketing preferences. For instance, steel coffee cans, which were a staple five years ago, are now very difficult to find in many markets, regardless of whether there is EPR or not in those markets. The change appears to have been driven by material cost, availability of alternative package formats, and consumer preference and marketing factors, and not EPR.

⁹ An interview with Joachim Quoden, General Manager, PRO EUROPE S.p.a. on March 28, 2012, revealed that Germany's high net cost is due to several factors including required payments to local authorities for promotion and education, the obligation to pay for public spaces collection, higher recycling rate targets than specified in the EU Directive (especially for lightweight plastics), and a very aggressive beverage container deposit-return system that removes the most valuable container types from the EPR recovery systems.

- There does not seem to be a strong correlation between EPR fees and recycling rates in the associated countries that were investigated – materials with higher recycling rates are not necessarily “rewarded” with lower EPR fees. Generally, fees were less for those package formats that use less materials (e.g., flexible packaging), even if they are not recyclable in a region.

Detailed results of the case study analysis follow.

Beverage Containers

Four packaging types for beverages were evaluated for the relationship of EPR fees with product purchase price, package costs, and recycling rates. The formats evaluated were PET bottle and cap, aseptic carton, glass bottle and metal cap, and aluminum can. The results for each package were calculated based on package sizes that contain eight ounces of beverage. Table 2-1 shows the results.

Figure 2-1
Beverage Containers Investigated



Table 2-1
Case Study Analysis of EPR on Different Beverage Container Formats

Container type and components ¹ (8 oz container sizes)	EPR fee per package ²	EPR fee to product price (%) ³	EPR fee to package cost (%) ³	Main/secondary components recycling rates (%) ⁴	Package weight (g)	Packaging disposed (g) ⁴
Ontario, Canada						
PET bottle & cap	C\$0.003410	0.6	1.1	24.9/24.9	23.7	17.8
Aseptic box	C\$0.002874	0.6	1.9	29.0/none	12.1	8.6
Glass bottle & metal cap	C\$0.007460	0.4	2.5	90.5/0	198.4	24.2
Aluminum can	C\$0.000059	<0.1	<0.1	41.9/none	11.3	6.6
Belgium						
PET bottle & cap	€0.006854	2.9	3.0	39/39	23.7	14.5
Aseptic box	€0.003997	1.3	3.5	81.4/none	12.1	2.3
Glass bottle & metal cap	€0.003934	1.0	1.7	100/94	198.4	0.5
Aluminum can	€0.002063	0.6	1.2	94/none	11.3	0.7
Germany						
PET bottle & cap	€0.030715	13.1	13.5	47/47	23.7	12.6
Aseptic box	€0.009099	2.6	8.0	67/none	12.1	4.2
Glass bottle & metal cap	€0.018423	0.8	8.1	82/92	198.4	35.3
Aluminum can	€0.008283	2.1	4.8	92/none	11.3	0.9

Section 2

- 1 Weights for main and secondary components for the PET bottle, Glass bottle and the Aluminum can are from the Flexible Packaging Association "Flexible Packaging, Less Resources, Less Footprint, More Value" (2009); weights for the Aseptic box come from the Editors of The ULS Report, "A Study of Packaging Efficiency as it Relates for Waste Prevention" (2007).
- 2 EPR fees for Ontario, Canada, Belgium and Germany are from EPI, using Stewardship Ontario 2011 fees for Ontario, Canada; Fost Plus 2011 fees for Belgium; and DSD 2007 fees for Germany. Fees are shown in Canadian dollars and Euros.
- 3 Product price and package cost come from Packaging & Technology Integrated Solutions, a division of HAVI Global Solutions Direct, LLC internal data.
- 4 Recycling rates for each country are from "Closing the Loop: Road Map for Effective Material Value Recovery", GreenBlue (2011). Rates are given for broad packaging categories, such as "glass", "plastic", "paper and board", and "metal," except for Ontario, which has broken out aluminum and steel packaging figures. Beverage container recycling rates may be higher or lower than general packaging material recycling rates. Beverage carton recycling rates come from Stewardship Ontario (2012 Fee Calculations Tables with Deficits.xls), Fost Plus "2010 Annual Report" for Belgium, and Germany (2010 statistic downloaded from website of Fachverband Kartonverpackungen für flüssige Nahrungsmittel e.V. on March 16, 2012).

Findings from the analysis are:

- Aluminum cans have low EPR fees in each of the countries relative to both product price and package format costs, likely because of their high scrap value.
- Accordingly, the reported recycling rates of metal packaging in Germany and Belgium are very high at 92 and 94 percent respectively; however, in Ontario the recycling rate of aluminum packaging is only 42 percent.
- Virtually all municipal solid waste in Belgium and Germany is sent for energy recovery, with subsequent recovery and recycling of virtually all metals, including steel and aluminum cans, from the post-combustion ash.
- Ontario Canada has the lowest EPR fees associated with aluminum cans by orders of magnitude, and the least EPR fees relative to both product price and package cost. Alternatively, the highest EPR fees in Ontario are assessed on glass bottles, compared to those for the other formats (glass has the highest recycling rate of the containers listed at 91 percent). A fee-setting policy in Ontario is that there should be no cross-subsidization of the cost of recycling materials.
- The recycling rate of PET (which is considered the general plastics recycling rate due to lack of detailed European data) is the least across all jurisdictions, 25 percent, 39 percent and 47 percent for Ontario Canada, Belgium and Germany, respectively. Note that in both Belgium and Germany, EPR fees per package and relative to the product price are the highest for PET bottles. In Germany, the EPR fee relative to package cost is notably high at 13 percent.
- In Germany, in contrast to the other two jurisdictions, the aseptic box has a low EPR fee per package, comparable to that for the aluminum can at 0.009 Euro/kg. The recycling rate of the aseptic drink box is 81.4 percent in Belgium, 65 percent in Germany, and 29.0 percent in Ontario. However, note that the EPR fees relative to package cost for aseptic box in both Ontario Canada and more so in Belgium are notably high compared to other formats.
- Little relationship exists between EPR fee levels and recycling rates. If an objective of EPR is to provide incentives to manufacturers to shift from less recycled package formats to more recycled package formats (based on recycling rates), the cost structures do not consistently provide this incentive: low EPR fees on aluminum cans in Ontario Canada are not associated with higher aluminum recycling; in Germany, the higher recycling rate of glass is not rewarded with lower EPR fees compared to less recycled aseptic containers.

- The EPR fee to package cost ratio is particularly high in Germany, at nearly 13 percent of the cost of a PET bottle, 8 percent for aseptic box and glass bottle, and almost 5 percent for aluminum can. In Belgium, both the aseptic box and PET bottle are approximately 3 percent of package cost, whereas in Ontario Canada the glass bottle has the highest EPR fee relative to the package cost at 2.5 percent.
- Cube utilization, which relates directly to a manufacturers' freight cost to deliver its product to market (and this is strongly considered by them), is a particular benefit with the aseptic box.
- For beverage containers, EPR fees added to the cost of all container choices and for the most part differences in EPR fee levels did not change the order (ranked from highest to lowest) of total container costs to deliver an equivalent amount of beverage for the three locations investigated. Only for the choice of a PET bottle versus a glass bottle for Belgium and Germany did the fee level result in a slight favoring of one container over another (glass over PET); however, the price signal was not consistent across the three jurisdictions nor was it large.

Snack Packaging

Three packaging types for snacks were evaluated for the relationship of EPR fees with product purchase price, package costs, and recycling rates. The formats evaluated were round spiral-wound paperboard canister with plastic lid, flexible stand-up pouch, and plastic bag in paperboard box. Because package sizes differ, results for each package were normalized to the packaging that would deliver 24 ounces to the consumer. Table 2-2 shows the results.

Figure 2-2
Snack Containers Investigated



Table 2-2
Case Study Analysis of EPR on Different Snack Package Formats

Package type and components	EPR fee per 24 oz product ¹	EPR fee to product price (%) ²	EPR fee to package cost (%) ²	Main/secondary components recycling rates (%) ³	Package weight (g) ⁴	Packaging disposed (g) ³
Ontario, Canada						
Spiral canister & lid (24 oz)	C\$0.009149	0.1	4.2	65.8/24.9	37.0	16.1
Flexible pouch (24 oz)	C\$0.003182	<0.1	2.3	1/none	11.3	11.2
Bag in box (15 oz)	C\$0.006328	<0.1	8.0	65.8/1	50.7	25.0
Belgium						
Spiral canister & lid (24 oz)	€0.012211	NA	7.3	89/0	37.0	11.5
Flexible pouch (24 oz)	€0.003732	0.1	3.5	39/none	11.3	11.3
Bag in box (15 oz)	€0.004677	0.1	7.7	89/0	50.7	16.1

Section 2

Package type and components	EPR fee per 24 oz product ¹	EPR fee to product price (%) ²	EPR fee to package cost (%) ²	Main/secondary components recycling rates (%) ³	Package weight (g) ⁴	Packaging disposed (g) ³
Germany						
Spiral canister & lid (24 oz)	€0.032355	0.9	19.4	88/47	37.0	7.9
Flexible pouch (24 oz)	€0.014645	0.2	13.8	47/none	11.3	6.0
Bag in box (15 oz)	€0.022149	0.3	36.6	88/47	50.7	10.9

1 EPR fees for Ontario, Canada, Belgium and Germany are from EPI, using Stewardship Ontario 2011 fees for Ontario, Canada; Fost Plus 2011 fees for Belgium; and DSD 2007 fees for Germany. Fees are shown in Canadian dollars and Euros.

2 Product price and package cost come from Packaging & Technology Integrated Solutions, a division of HAVI Global Solutions Direct, LLC internal data.

3 Recycling rates for each country are from "Closing the Loop: Road Map for Effective Material Value Recovery", GreenBlue (2011). Rates are given for broad packaging categories, such as "plastic" and "paper and board." Actual package component recycling rates may be higher or lower than general packaging material recycling rates. Laminate plastic (bag/pouch) recycling rates come from Stewardship Ontario (2012 Fee Calculations Tables with Deficits.xls). Packaging disposed is per 24 ounces of product delivered, multiplied by packaging components recycling rates.

4 Weights for the round spiral canister, and flexible standup pouch are from the Battelle "Final Report on Sustainability Assessment of Flexible Packaging (2009); weights for the Bag-in-box are from the Editors of The ULS Report, "A Study of Packaging Efficiency as it Relates for Waste Prevention" (2007). The Bag-in-Box format was 15 oz. It was normalized via a linear assumption for box and liner weights by a factor of 1.6 to provide an equivalent package for 24 oz of product.

Findings from the analysis are:

- The EPR fees as a percentage of product price and package cost favors the flexible stand up pouch format over either of the other formats, consistently across the three jurisdictions, driven by the lightweight nature of flexible packaging. However, for none of the three jurisdictions investigated, did the differential in EPR fees cause a shifting in the order of ranking by cost for package formats.
- The EPR fees relative to package cost for flexible stand up pouches are at least half of those for the others – 2 percent compared to 4 percent and 8 percent for the round spiral wound canister and bag-in-box, respectively, in Ontario Canada, and 14 percent compared to 19 percent and 37 percent respectively in Germany.
- The round spiral wound canister has the highest EPR fee in each of the jurisdictions, as well as highest EPR fee to product price, but in general, these fees are relatively small, less than 1 percent, for all formats.
- In contrast, the EPR fees relative to package cost are significant for each of the packaging formats, particularly in Germany. This is even more so for the bag-in-box format, where EPR fees add 37 percent to a manufacturer's package cost.
- Despite the low recycling rates in Germany and non-recyclability in the other locations, flexible pouches result in the least quantity of packaging being disposed compared to the other formats. EPR fees are least for flexible pouches compared to the other snack package formats.
- Consistently, the bag-in-box has the highest relative EPR fee to package cost and the flexible stand up pouch has the lowest relative EPR fee to package cost. However, the EPR fee applied to the package formats is not sufficiently differentiated to cause a shifting in the order of cost for each package format option. EPR does not provide a price signal that would cause a manufacturer to change packaging format types for the snack packaging examined in this study.

Coffee Packaging

Three packaging types for 11.5 ounces of ground coffee were evaluated for the relationship of EPR fees with product purchase price, package costs, recycling rates and amount of packaging disposed. The formats evaluated were metal canister with plastic lid, plastic canister and lid, and flexible brick laminate. Table 2-3 shows the results.

Figure 2-3
Coffee Packaging Investigated



Table 2-3
Case Study Analysis of EPR on Different Ground Coffee Package Formats

Package type and components (11.5 oz size)	EPR fee per 24 oz product ¹	EPR fee to product price (%) ²	EPR fee to package cost (%) ²	Main/secondary components recycling rates (%) ³	Package weight (g) ⁴	Packaging disposed (g) ³
Ontario, Canada						
Steel canister & lid	C\$0.007308	0.2	2.1	58.8/24.9	96.1	41.6
Plastic canister & lid	C\$0.009265	0.2	3.1	24.9/24.9	58.6	44.0
Flexible brick laminate	C\$0.003191	<0.1	2.1	1/none	11.3	11.2
Belgium						
Steel canister & lid	€0.007550	0.2	2.9	94/0	96.1	11.3
Plastic canister & lid	€0.017271	0.3	7.6	39/39	58.6	35.7
Flexible brick laminate	€0.003742	0.1	3.3	0/0	11.3	11.3
Germany						
Steel canister & lid	€0.073763	0.7	24.9	92/47	96.1	10.3
Plastic canister & lid	€0.075946	1.4	33.5	47/47	58.6	31.1
Flexible brick laminate	€0.014684	0.4	12.9	47/none	11.3	6.0

1 EPR fees for Ontario, Canada, Belgium and Germany are from EPI, using Stewardship Ontario 2011 fees for Ontario, Canada; Fost Plus 2011 fees for Belgium; and DSD 2007 fees for Germany. Fees are shown in Canadian dollars and Euros.

2 Product price and package cost come from Packaging & Technology Integrated Solutions, a division of HAVI Global Solutions Direct, LLC internal data.

3 Recycling rates for each country are from "Closing the Loop: Road Map for Effective Material Value Recovery", GreenBlue (2011). Rates are given for broad packaging categories, such as "plastic" and "paper and board." Actual package component recycling rates may be higher or lower than general packaging material recycling rates. Laminate plastic (bag/pouch) recycling rates come from Stewardship Ontario (2012 Fee Calculations Tables with Deficits.xls). Packaging disposed is per 24 ounces of product delivered, multiplied by packaging components recycling rates.

4 Weights for the metal canister and plastic canister are from the Editors of The ULS Report, "A Study of Packaging Efficiency as it Relates for Waste Prevention" (2007); weights for the flexible brick laminate comes from the Flexible Packaging Association "Flexible Packaging, Less Resources, Less Footprint, More Value" (2009).

Findings from the analysis are:

- The significance of EPR fees on packaging prices varies considerably based on jurisdiction, ranging from 2-3 percent in Ontario Canada, with the least EPR fees relative to package cost, and Germany having the highest, ranging from 13 percent to 34 percent.

- Despite the low recycling rates in Germany and non-recyclability in the other locations, flexible brick laminates result in the least quantity of packaging disposal compared to the other formats per unit of product delivered. EPR fees are least for flexible brick laminates compared to the other ground coffee package formats, simply because laminates use less material resources – EPR does not provide an effectual incentive to choose a more highly recycled package format. Flexible brick laminates are a highly efficient form of packaging in terms of package material cost, distribution efficiency, and shelf space utilization. These drivers, in conjunction with consumer preference, are understood to serve as primary drivers for packaging selection, not EPR.
- EPR fees applied to the package formats are not sufficiently differentiated to cause a shifting in the order of cost for each package format option. EPR does not provide a price signal that would cause a manufacturer to change from one packaging format type to another for the package formats examined in this study for ground coffee.

Conclusions

The premise of advocates of packaging EPR is that consumer packaged goods companies often choose packaging that is not cost-effective to recycle and that they over-package, and so government must reign-in those companies by means of EPR. While examples of over-packaging can be found, unneeded packaging represents an additional expense to companies, and companies generally reduce cost where feasible.

The data that we reviewed for this report does not support the assertion that EPR has resulted in packaging design changes that benefit the environment or reduce the use of resources. We found that:

- Packaging use has declined in the United States, where there is no packaging EPR, but it has increased slowly in Europe, where there is widespread packaging EPR. There is no indication that EPR has reduced packaging use economy-wide or had any effect on package design and selection.
- In most jurisdictions, price signals sent by EPR to manufacturers are very weak compared to the overall value of the products they contain and price of packaging.
- Packaging EPR generally does not change the relative package cost among different package alternatives for a product – there is insufficient EPR fee differentiation to cause consumer packaged goods companies to switch from one package format to another.

Even if EPR were to be effective in compelling companies to significantly use less packaging, there is a danger that the result would be regressive and harm the environment, rather than benefit it. The Consumer Goods Forum notes that:

Products generally represent far greater resources and have a much higher inherent value than the packaging used to protect them. Thus, product losses due to underperforming packaging are likely to cause much greater adverse effects on the environment than the gains made through excessive packaging reduction.¹⁰

¹⁰ "A Global Language for Packaging and Sustainability," Consumer Goods Forum, revised edition September 2011.

Section 3

EPR PROGRAM DIVERSION RATES

Introduction

Advocates for packaging EPR claim that it results in higher recycling rates compared to non-EPR programs and policies, contributing to ultimate goals of less landfill land use, less pollution and greenhouse gas generation, and more sustainable use of resources. This section examines reported performance data for EPR programs, to the extent that data was available. The analysis of this section generally indicates the extent to which packaging EPR contributes to meeting ultimate goals and objectives.

SAIC has conducted a number of waste and recycling composition studies of the residential waste stream. It is important to note that in most locations residential non-packaging paper is generated in twice the amount of packaging paper/paperboard. For this reason, and because of the cost-effectiveness of collecting and recycling the paper from such programs, municipal recycling programs have historically collected non-packaging printed paper for recycling in addition to paperboard packaging. Because recycling of residential paper is inexorably a part of residential recycling programs in North America, advocates for packaging EPR add and include “printed paper” whenever packaging EPR is being discussed.

Care must be taken when reviewing program reports to determine whether producers of printed paper pay EPR fees on their products, and whether the recycled quantities of paper are counted or credited in the program financial or operational results. Because the legal framework in Europe only addresses packaging, and not printed paper, all packaging EPR statistics from Europe exclude paper recycling, and so are not directly comparable to those of North American programs, unless one makes adjustments to enable comparisons.

Overview of Packaging EPR Programs in Europe and Canada

Europe

The legal basis of European packaging EPR comes from European Parliament and Council Directive 94/62/EC of December 1994 on Packaging and Packaging Waste (Packaging Directive). The Packaging Directive set common recovery goals for packaging, with different targets for different major materials groups (i.e., there are different targets for glass, metal, paper, plastic, and wood packaging). Recovery goals are for all packaging whether it is generated in residential or industrial/commercial/institutional settings. Printed paper is not included in the European Union targets. Furthermore, energy recovery is identified as “an effective means of packaging waste recovery” and packaging that is difficult to recycle cost-

effectively is often allowed to go to energy recovery instead of incurring high costs to recycle those materials.

The Packaging Directive states that it is “essential that all those involved in the production, use, import and distribution of packaging...and in accordance with the polluter-pays principle they accept responsibility for such waste...within a spirit of shared responsibility.” This language set the stage for EPR of packaging in European Union countries.

Countries who are members of the European Union (EU) are required to pass individual country laws to implement the directive, and differences in those laws, national approaches, and national producer responsibility organizations (PROs) mean that each country’s EPR programs have unique variations and do not necessarily offer the same services. Furthermore, when costs are being compared, producers may be responsible for only a portion of costs in one jurisdiction (consistent with the “shared responsibility” language of the Packaging Directive), but a higher allocation, or in some cases complete responsibility, in other jurisdictions. Many of the European packaging collection programs co-collect non-packaging paper with packaging paper and paperboard, which complicates any analysis of cost and recovery statistics, since one must verify what is being included or not included in reported figures (packaging recycling statistics that are reported to the EU statistical agency are supposed to exclude non-packaging paper that may be co-collected with packaging paper).

Statistics reported by PROs often only tell their part of the story, and can be confusing, since they represent their members and not necessarily all packaging producers or the entire recycling system. For example, the PRO for residential packaging in Belgium, Fost Plus, reported achieving a packaging recycling rate of 92 percent in 2010. When one delves into its annual report one finds that this figure includes contributions from reported recycling rates of 113 percent of paper/cardboard packaging, 112 percent of glass packaging, 102 percent of metal packaging, and 37 percent of plastic packaging.¹¹ Statistics for Belgium are investigated in detail in a case study in Section 4 of this report, so a complete explanation behind the Fost Plus’ numbers will not be discussed here. However, a simplified explanation is that some non-household packaging is included in the numerator of recycling rate calculations, and the denominator of the calculations only includes Fost Plus’s members’ packaging generation (i.e., not all residential packaging generated in Belgium).

Canada

The Canadian Council of Ministers of the Environment (CCME) approved in principle a document titled “Canada-Wide Action Plan for Extended Producer Responsibility” on October 29, 2009. The intent was to provide a coordinated and harmonized approach to EPR in Canada for both packaging and non-packaging products.

In Canada, all packaging EPR program statistics include printed paper in both numerator and denominator of recycling rate calculations. Unlike European EPR programs, producers of printed papers in Canada also have to provide some financial

¹¹ “Annual Report 2010,” Fost Plus, May 2011.

support into the recovery programs. Often this financial support includes in-kind contributions of newspaper space for local governments to use for promoting and educating the population about their recycling programs. Current packaging and printed paper EPR programs in Canada are found in the provinces of Manitoba, Ontario, and Quebec – all of these EPR programs are shared responsibility models, where municipalities design and operate programs and are compensated a percentage of net program expenses from industry funding organizations. However, Quebec is in the process of transitioning to full industry funding of municipal program operational expenses, which will be achieved in 2013.

Packaging and printed paper EPR is coming to British Columbia but has not yet been implemented. A stewardship organization, Multi-Material British Columbia (MMBC), has been formed by five organizations that represent about 90 percent of the brand owners and retailers selling packaged products and printed paper in the province. The organization has until May 2014 to begin operating its program. Packaging and printed paper EPR in British Columbia will be under a full industry funding model for recycling program costs. BC's program will be carefully monitored by many, as this will be the first full EPR program for packaging and printed paper in North America where industry will make recycling program operational decisions, unlike the EPR programs in Ontario, Manitoba and Quebec, in which municipalities operate municipal programs and are reimbursed some percentage of the cost.

Unlike Europe, there is generally no consideration given for packaging sent to energy recovery in Canada.

Overview of Packaging EPR Performance

Comparability of Data and Program Targets

Many factors can affect the actual or apparent (reported) performance and cost of EPR programs. These factors include who decides which materials will be collected for recycling, the extent to which materials outside of the home are included, whether there are deposit-return systems for beverage containers, extent of recovery program cost sharing, social/geographic factors (including population density and geographic distances), waste disposal infrastructure and costs, the aggressiveness of performance targets, and whether there are supporting governmental policies. The impact of some of these factors (e.g., the social/geographic factors), mean that program metrics from other places, especially those relating to cost, may not be applicable to a region that is structurally different. Furthermore, as was discussed previously, it is critical to scrutinize any cost or recovery statistic to identify what is included or not included before attempting to make comparisons.

For this study, SAIC conducted an interview with PRO EUROPE to better understand the data associated with European packaging EPR systems. PRO EUROPE is an association of PROs from 33 countries engaged in the selective collection and recycling of packaging waste. It provides a platform for best practice and information exchange and the ongoing development of packaging recovery. According to PRO EUROPE, there has not been a comprehensive study that documents full system costs

of recycling under EPR in European countries, and even if there had been such an attempt, the scope of each country’s systems typically differ so much from each other (e.g., definition of household, inclusion of deposit systems, whether targets are set higher than the Packaging Directive) that one really cannot benchmark systems.¹²

Table 3-1 summarizes the different performance targets for packaging EPR in the European Union and the Canadian provinces that have or are implementing EPR.

**Table 3-1
Packaging EPR Locations and their Recycling Targets**

Location	Applicable Discards	Packaging and Printed Paper	Packaging				
			Paper/ Paperboard	Plastics	Metal	Glass	Beverage Containers
European Union ¹	Residential/ commercial	n/a	All packaging 55% min - 80% max				
			60% min	22.5% min	50% min	60% min	n/a
British Columbia	Residential/ commercial	? ²					
Manitoba	Residential ³	None ³					75%
Ontario	Residential	70%					
Quebec	Residential	70% ⁴					

1. These percentages come from the EU packaging directive. European countries must individually implement the minimum requirements of the directive; however, a number of countries have mandated higher material-specific recycling targets, such as Belgium and Germany, which have mandated the maximum target of 80 percent. It was beyond the scope of this project to individually itemize each country’s targets. In addition, the Packaging Directive requires a minimum recovery amount of 60 percent of packaging waste (e.g., including waste-to-energy).
2. British Columbia’s Recycling Regulation (2004) generally identifies a 75% recovery rate target; however, it also provides for any other target set by the Director or the plan submitted by industry and approved by the Director. Historically, BC has provided industry with leeway in plans for new programs for lower initial targets, with the expectation that targets will be increased in future revisions to the plans. Because BC’s plan is still under development, agreed-upon targets have not yet been set.
3. Although there is no specific overall recycling target for packaging and printed paper, there is a 75 percent target for beverage containers and a 50 percent plastic carryout sack reduction target. The beverage container target applies to all beverage containers regardless of where generated, including in commercial buildings and public spaces.
4. Quebec has a policy goal to recycle 70 percent of paper, cardboard, plastic, glass, and metal waste by the end of 2015. The policy does not distinguish between generating sector or program, and is presumed to apply to Quebec’s Blue Box program at the same level of the general waste policy.

Comparison of Recycling Rates

Table 3-2 shows how packaging recycling rates have changed over time in European countries since the Packaging Directive was issued in 1997. It should be noted that different countries have joined the EU at different times and so some countries are further along with complying with the Packaging Directive’s requirements than others. In addition, some countries are not members of the EU (e.g., Norway, Switzerland) and so are not included in the table, which comes from data reported to the EU.

¹² SAIC interview with Joachim Quoden, General Manager, PRO EUROPE S.p.r.l. on March 28, 2012.

Table 3-2
Packaging Recycling Rates in European Union Countries

Country	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
EU (27 countries)	:	:	:	:	:	:	:	:	54.6^s	56.9^s	59.2^s	60.5^s	62.3^s
Austria	64.5	64.9	65.6	69.4	64.3	65.9	64.2	66.2	66.9	68.4	67.2	67.9	66.9
Belgium	62.3	63.5	59.4	62.5	71.3	70.2	73.9	76.4	76.8	79	80.4	78.9	79.1
Bulgaria	:	:	:	:	:	:	:	:	30.8	35	54.8	50.3	45.9
Czech Republic	:	:	:	:	:	:	51.4	55.7	59	63.4	65.9	67.1	68.8
Denmark	40.1	50	53	55.7	57.2	57.3	53.8	53.2	52.5	56.2	56.8	59.7	84
Germany	80.6	79.7	79.2	78	75.9	74.4	70.6	69.6	68.2	66.5	66.9	70.5	73.5
Estonia	:	:	:	:	:	:	:	33.5	40.3	45.7	49.6	43.5	57.2
Ireland	15.2	14.8	17.4	18.9	27	34.9	51.2	56.4	55.6	54.5	60.6	61.7 ^s	64.9
Greece	37	34.6	33.6	33.3	33.4	32.6	33.1	36.7	41.8	42.8	48	43.8	:
Spain	33.5	33.6	37.9	39.8	43.6	44.3	43.1	47.4	50.4	54	56.3	59.1	60.3
France	39.7	41.5	42.1	42.2	44	45.4	47.9	50.7	53.3	54.8	57	55.2	56.4
Italy	3	31.6	34	38.4	45.5	51.4	51.4	53.3	53.7	54.9	56.8	59.6	64
Cyprus	:	:	:	:	:	:	:	22	11.1	25.2	25.7	34	42.2
Latvia	:	:	:	:	:	:	:	45.6	47	42.2	39.6	46.8	44.9
Lithuania	:	:	:	:	:	:	:	32.7	32.5	37	42.9	51.7	57.7
Luxembourg	38.4	41.8	39.8	45.2	57.3	56.8	60.1	61	62.6	63.8	62.5	63.6	61
Hungary	:	:	:	:	:	:	:	43.3	45.9	48.9	46.4	50.8	51.1
Malta	:	:	:	:	:	:	:	5.9	8.1	10.8	10.4	:	:
Netherlands	55.2	62.4	63.6	58.8	56	57.4	56.4	58.5	59.4	70.2	69.8	72.4	74.9
Poland	:	:	:	:	:	:	:	28.3	29.5	37.1	48.2	42.9	36.8
Portugal	:	34.8	34.9	30.8	37.7	35.8	38.3	41	44.3	51.4	56.5	61	59.9
Romania	:	:	:	:	:	:	:	:	23	28.6	30.6	33.5	40.5
Slovenia	:	:	:	:	:	:	:	34.3	45.3	40.3	46.9	52.4	49.6
Slovakia	:	:	:	:	:	:	36.3	37.6	29.8	36.3	61.1	47.7	59.9
Finland	41.7	44.6	49.5	49.8	47.2	49.2	40.8	39.9	43.2	49.1	51.9	56.7	55.5
Sweden	57.9	74.9	65.1	57.8	63.2	64.7	60	49.8	48.2	58.1	59.3	58.5	58.9
United Kingdom	24.1	28.2	35.3	39.9	42.4	44.2	46.8	49.7	54.4	57.5	59.3	61.5	61.8

:=Not available s=Eurostat estimate

Source: Eurostat, downloaded February 21, 2012, from

<http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=ten00063>

As Table 3-2 shows, the packaging recycling rate in EU-27 countries is 62 percent. Countrywide packaging recycling rates are not available for Canada. By comparison, the recycling rate for packaging in the United States in 2010 was 48 percent, and when printed paper is included (as in Canadian EPR), the packaging and paper recycling rate in the United States is 52 percent.¹³

An ultimate objective of EPR as illustrated previously in Figure 1-1 is to achieve high recycling rates in order to reduce emissions, reduce landfills (land use), and contribute toward a more sustainable use of resources. In the United States, packaging represents

¹³ “Municipal Solid Waste Generation, Recycling, and Disposal in the United States - Tables and Figures for 2010,” U.S. EPA, November 2011.

Section 3

only 30 percent of all generated municipal solid waste,¹⁴ and an unbalanced focus in terms of policies and financial resources on packaging to the exclusion of other discards can result in a failure to truly progress toward ultimate objectives. Table 3-3 provides a broader perspective on how the United States (no EPR), Canada (62 percent population with packaging EPR), and EU-27 countries (all with EPR) manage their discards.

**Table 3-3
2008 Municipal Solid Waste Management**

	Landfilled	Incinerated	Recycled	Composted
United States	54	13	24	9
Canada	72	3	18	7
EU-27	40	20	23	17
Austria	3	27	29	40
Belgium	5	36	35	25
Bulgaria	100	0	0	0
Czech Republic	83	13	2	2
Denmark	4	54	24	18
Germany	1	35	48	17
Estonia	75	0	18	8
Ireland	62	3	32	3
Greece	77	0	21	2
Spain	57	9	14	20
France	36	32	18	15
Italy	44	11	11	34
Cyprus	87	0	13	0
Latvia	93	0	6	1
Lithuania	96	0	3	1
Luxembourg	19	36	25	20
Hungary	74	9	15	2
Malta	97	0	3	0
Netherlands	1	39	32	27
Poland	87	1	9	4
Portugal	65	19	9	8
Romania	99	0	1	0
Slovenia	66	1	31	2
Slovakia	83	10	3	5
Finland	50	17	25	8
Sweden	3	49	35	13
United Kingdom	55	10	23	12

Sources: "Municipal Solid Waste Generation, Recycling, and Disposal in the United States - Detailed Tables and Figures for 2008," U.S. EPA, November 2009; "Waste Management Industry Survey: Business and Government Sectors 2008," Statistics Canada, December 2010 (with 3 percent incineration estimate from <http://www.energyfromwaste.ca/resources/EFW-Worldwide>), and "Eurostat News Release 43/2010," March 2010.

¹⁴ "Municipal Solid Waste Generation, Recycling, and Disposal in the United States - Tables and Figures for 2010," U.S. EPA, November 2011.

As Table 3-3 shows, U.S. recycling rates (exclusive of organics diversion/composting) exceeded that of the EU-27 and Canada in 2008, despite the fact that there is no packaging or printed paper EPR in the United States.

Conclusions

Despite not having EPR for packaging, the municipal solid waste (MSW) materials recycling rate of the United States is slightly greater than the European Union 27 countries (only 37 percent of those countries exceed the U.S. recycling rate), and far exceeds that of Canada. In Europe, there is greater diversion of organics and municipal solid waste to waste-to-energy plants, so the amount of MSW landfilled there is less than in North American countries.

The focus of Canadian packaging and paper EPR programs to date has been on consumer packaging, including away from home beverage packaging in Manitoba, but otherwise limited to the residential waste sector. This somewhat narrow focus of targeting only a small portion of the MSW stream (only packaging and paper, and only from the residential sector) has not resulted in high overall MSW recycling rates. For example, Ontario's Blue Box program is only applicable to 11 percent of Ontario's waste stream.¹⁵ While it is effective in recycling a large portion of what it targets, at a fairly high cost, its overall impact on the province's MSW recycling rate is fairly minimal, and as a result Ontario's overall waste diversion rate (including both recycling and organics processing/composting) is 23 percent.

Belgium leads most other European countries in terms of its overall MSW and packaging recycling rates. While the Belgian experience demonstrates that high packaging recycling rates can be achieved, it has not been demonstrated that EPR has been the cause of Belgium's high recycling rates. There are a number of unique factors in Belgium not the least of which include its high population density, extremely high waste disposal costs, and the fact that MSW cannot be delivered to a landfill (processable MSW must go to waste-to-energy facilities). These social/geographic and waste policy and waste infrastructure factors are unrelated to EPR and likely have more influence on the country's high recycling rates than does packaging EPR.

The following Section 4 presents an in-depth analysis of packaging and paper recycling programs in Belgium, Ontario, Quebec, and the non-EPR jurisdiction of Ramsey County Minnesota, so that a comparison can be made of the cost and effectiveness potential of EPR and non-EPR programs.

¹⁵ "From Waste to Worth: The Role of Waste Diversion in the Green Economy," Ontario Ministry of the Environment, October 2009

Section 4

IN-DEPTH ANALYSIS OF SELECT PACKAGING AND PAPER PROGRAMS

Belgium

Summary of Programs and Operations

In Belgium, EC Directive 94/62/EC was transposed into national law as a Cooperation Agreement between the three Belgian regions (Brussels, Flanders and Wallonia) and came into effect on March 5, 1997. The Cooperation Agreement relates to the prevention and management of all household packaging waste generated in Belgium since 1997, and since 1998 has covered industrial packaging waste as well. The Cooperation Agreement obliges parties responsible for producing packaging to comply with three legal obligations:

1. **Take-back obligation:** the obligation to recycle or recover a certain percentage of the packaging brought onto the market. As of 2009, the targets are 80 percent packaging recycling,¹⁶ 90 percent total recovery of residential packaging (recycling plus energy recovery), and 85 percent total recovery of commercial packaging.
2. **Information obligation:** the obligation to inform the Interregional Packaging Commission (IVCIE) of the nature of the packaging and the recycled percentages achieved, demonstrating that companies have complied with the legal requirements.
3. **Prevention plan:** the obligation, every three years, to develop a prevention plan that describes the measures taken to reduce the quantity of packaging and the objectives the company wants to achieve. A producer can draw up an individual prevention plan or can subscribe to a collective prevention plan.

The Interregional Packaging Commission is composed of representatives of the three regions and oversees the implementation of the Cooperation Agreement. Its main responsibilities include:

- Granting, suspending and withdrawing the license of any accredited collective producer responsibility organization.
- Approving the plans of PROs and those companies that choose individual compliance to fulfill their take-back obligations.
- Verifying that the minimum recovery and recycling percentages are achieved by individual companies or approved PROs.

¹⁶ It is important to note that the recycling target is significantly higher than the minimum of 55 percent set by the European Parliament and Council Directive 94/62/EC of December 1994 on Packaging and Packaging Waste (and at the maximum that can be required of 80 percent).

- Verifying the information and data submitted.

There are two producer responsibility organizations in Belgium. Fost Plus is the officially approved PRO for household packaging recovery and VAL-I-PAC is the officially approved PRO for industrial, commercial, and institutional packaging recovery.

Fost Plus

Fost Plus promotes and finances the selective collection, sorting, and recycling of household packaging waste. The Fost Plus system is a partnership model between local waste management authorities and Fost Plus. Under this model, Fost Plus pays 100 percent of the cost of a “model” collection program to local authorities. Local authorities arrange for collection of the recyclables, although Fost Plus plays a consultative role if local authorities contract for service delivery. If recycling is not provided efficiently, or if local authorities choose to deliver premium services above the service standards of the model program, any additional cost is at their own expense.

Companies responsible for placing residential packaging on the market (importers, Belgian producers, or distributors) sign a standard membership contract to join Fost Plus and submit an annual declaration of all single-use and reusable household packaging they place on the Belgian market. Fost Plus needs this information to identify the take-back obligation of its members and meet the information obligation to IVCIE. By the end of 2010, 5,235 companies were members of Fost Plus, representing approximate 92 percent of the residential packaging placed on the market.¹⁷ Members of Fost Plus pay fees to the PRO based on the quantity of packaging declared by them multiplied by fee rates for different packaging types.

Following are the collection standards for residential packaging materials under the Fost Plus model program:

- Glass: consumers are responsible for delivering glass bottles and jars to bottle banks (drop-offs) where they must color-sort the bottles – the coverage standard is one site per one thousand inhabitants.
- Paperboard packaging: paperboard and corrugated container packaging is collected curbside, once per month. Scrap paper, newspapers and magazines are also accepted for collection, but Fost Plus is only responsible for paying an allocated portion of paper collection cost based on the relative quantity of packaging materials in the mix. The allocated cost of non-packaging paper collection and recycling is borne by municipalities.

¹⁷ Source: “Annual Report 2010,” Fost Plus (calculated by dividing estimated tonnes on market by tonnes declared by members). The majority of the remaining packaging is considered “free riders” meaning that obligated producers/importers of packaged products are not paying their share of the recovery system funded by Fost Plus. It should be noted that small producers who place 300 tonnes of single-use packaging or less per year on the market are exempt from joining Fost Plus (<http://www.fostplus.be/Enterprises/Pages/Legal%20obligations.aspx>), and others have elected to provide their own individual take-back system.

- Plastic bottles, metal packaging, and paper beverage cartons: these materials are collected door-to-door, twice a month, in a translucent, light blue bag.¹⁸

VAL-I-PAC

The Belgian business community founded VAL-I-PAC in 1997 to promote and coordinate the recycling of industrial packaging. Today VAL-I-PAC represents over 8,000 Belgian companies, representing approximately 84 percent¹⁹ of the non-household packaging materials placed on the market, and assisting the documentation of compliance with the Belgian packaging recycling law on behalf of its members. VAL-I-PAC gathers the proof of recycling and recovery and passes this information to the IVCIE. The information is gathered from two sources:

- Declarations sent by members (those responsible for packaging) on the amount of industrial packaging they have put on to the market in supplying packaged products to their customers, the “unpackers.”
- Data sent by collectors on the amount of industrial packaging waste collected and recycled or recovered.

VAL-I-PAC does not organize the collection of commercial packaging – instead it allows for private enterprise for the provision of recycling services to commercial sector generators. VAL-I-PAC does, however, offer modest incentives to encourage collectors to collect plastics and wood packaging for recycling, register with VAL-I-PAC, and provide reports on the quantity of materials collected and recycled.²⁰

Cost and Effectiveness

IVCIE

IVCIE is the governmental commission tasked with administering packaging EPR in Belgium and its operations are funded by the three Belgian regions. IVCIE’s 2010 operating cost to administer EPR was 1,047,300 Euros (a 0.2 percent increase from 2009).²¹ Because IVCIE only administers EPR and does not operate programs, there are only cost and no packaging recovery quantities for IVCIE.

¹⁸ At the time of this report, the Fost Plus model program only includes plastic bottles and not other types of packaging plastics, after considering the significant impact on program cost and marginal additional tonnes that may be collected from expanding the list of plastics. Some additional types of plastics are collected in certain locations under pilot programs and municipal initiatives.

¹⁹ “The Belgian Legislation on Packaging Waste,” presented by IVCIE on October 25, 2011, to a stakeholder meeting of the European Commission.

²⁰ The amount of the incentive at the time of this report was €35 per metric tonne of plastic and €10 per metric tonne of wood packaging (e.g., pallets/crates). Incentives are also provided to offset the cost of servicing recycling collection containers ranging from €20-110 per year depending on the size of the recycling container, and/or €0.50 per large bag of film packaging or expanded polystyrene foam packaging. (Source: <http://www.valipac.be/Belgium/receive-incentive/different-types-incentives.php>, March 2012).

²¹ IVCIE 2010 Annual Report.

Fost Plus

Fost Plus reports its cost and recovery figures on the basis of the quantity of packaging its members report having placed on the market (its figures do not include non-member tonnes), and the model program cost it pays to regional municipal waste authorities, which differs from actual program costs. Because the packaging paperboard is co-collected with printed paper, the costs and materials revenues for paper and paperboard recycling are allocated between Fost Plus and regional municipal waste authorities. For all of the above reasons, Fost Plus payments for operating residential recyclables collection programs in Belgium should not be confused with actual total system costs. Table 4-1 shows an SAIC estimate for the total system cost of residential recycling in Belgium.

Table 4-1
Estimated 2009 Cost of Residential Packaging and Paper Recycling Programs in Belgium

	Fost Plus Cost (million Euros)	Municipal Authorities Cost (million Euros)
Cost of collection and processing	€ 94.1 ¹	€ 28.3 minimum ²
Municipal program management fee	5.4 ³	unknown ³
Other direct program delivery costs	14.5 ⁴	
Other financial, operational, and administrative costs	5.1	
Total gross cost ⁵	€ 119.1 ⁶	€ 28.3 minimum

1 "Annual Report 2009," Fost Plus.

2 Estimated by SAIC based on Fost Plus Annual Report 2009 collection cost of €51.42 per tonne and paperboard packaging recycling of 183,653 tonnes (overall cost to Fost Plus of €9.4 million). Based on a cost and revenue share allocation of 25 percent Fost Plus and 75 percent municipalities. Note that significant additional municipal costs may be incurred for paper processing and for expanded recycling programs above the Fost Plus model program.

3 Fost Plus provides a fee of €0.50 per person (for 10.8 million Belgians) to municipalities. It is likely that this fee only partially offsets municipal costs of program administration, cost of municipal capital, and municipal promotion and education.

4 Includes communications and public outreach, including litter reduction messaging.

5 Totals are gross costs and exclude offsetting revenues from the sale of processed materials, which in 2009 amounted to €26.2 million retained by Fost Plus and €9.1 in paper revenues received by municipalities.

6 This figure does not match totals in the Fost Plus Annual Report 2009, which also include payments to municipalities for their share of revenues from the sale of collected paper as a cost. Fost Plus also shows these paper recycling revenues as revenues (i.e., a pass-through) in the Fost Plus financial statements. Fost Plus also includes other financial provisions in its annual report, including depreciation and contingency fund contributions/withdrawals that can obscure estimates of actual program costs.

As Table 4-1 shows, the total gross cost of providing residential recycling services to residents of Belgium is over 147 million Euros. Because total system costs are not documented, it is likely that the full cost of providing recycling services to Belgians is several million Euros over this amount.

Table 4-2 shows the recycling and recovery rates that Fost Plus reports.

**Table 4-2
Fost Plus Reported Recycling and Recovery Results**

Residential Packaging	2009		2010	
	Tonnes	Rates	Tonnes	Rates
Paper and Cardboard ¹	198,508	117.5%	201,005	112.9%
<i>Paper and Cardboard</i>	183,653	122.7%	185,472	116.4%
<i>Drink Cartons</i>	14,855	77.1%	15,533	82.8%
Plastics	69,027	37.6%	71,381	37.2%
<i>Bottles and Flasks</i>	61,422	71.2%	62,706	72.9%
Glass ²	330,334	112.2%	334,935	111.7%
Metals ³	83,093	102.3%	83,478	102.1%
Others	24	0.7%	29	0.8%
Total Recycling	680,987	93.1%	690,828	91.5%
Waste-to-Energy	25,086	3.4%	25,292	3.4%
Total Recovery	706,073	96.5%	716,120	94.9%

Source: Fost Plus 2009 and 2010 Annual Reports

- 1 The paper and cardboard recycling percentage is also greater than 100% because not all parties responsible for packaging are affiliated to Fost Plus (i.e., the denominator of the equation used to calculate these figures only includes the quantity of packaging reporting by Fost Plus members – it does not include the total amount of packaging on the market). In addition, households put out certain kinds of paper and cardboard packaging for collection that cannot be regarded as household waste under the definition of household packaging.
- 2 The glass recycling percentage is greater than 100 percent because it also includes glass derived from the hotels, restaurants, and catering sector (12,092 tonnes in 2009 and 15,168 tonnes in 2010), which cannot be regarded as household waste under the definition of household packaging. Recycling figures also include parallel glass imports of approximately 30,000 tonnes.
- 3 Includes 28,180 tonnes in 2009 and 38,180 tonnes in 2010 of metal packaging recovered from the ash of waste-to-energy plants that has not been collected through municipal/Fost Plus recycling collection systems.

It is very important to note that a number of recycling and recovery rate statistics reported by Fost Plus are above 100 percent, including those for paper packaging, glass packaging, and metal packaging. This is because Fost Plus only includes the packaging quantities reported by its members in the denominator of the recycling rate equations. Any commercial quantities or quantities from “free riders” that are collected are included as numerator tonnes, but their generation quantities are not reflected in the denominators. Furthermore, in the case of metal packaging, since 100 percent of Belgium’s waste is combusted for energy prior to land disposal, all metal packaging is counted as recycled by Fost Plus whether collected in the recycling system or recovered from the post-burn ash. The impact of these approaches to reporting recycling and recovery figures carries through to the bottom line. Residential packaging recycling and recovery rates in Belgium in reality do not exceed 90 percent as reported by Fost Plus. IVCIE as the agency that ensures compliance with the Belgian Cooperation Agreement takes the figures reported by Fost Plus and adjusts them. IVCIE for 2009 credited Fost Plus with an 83.5 percent recycling rate, or 10 percentage points less than the rate reported by Fost Plus.²²

²² “Rapport d’Activités 2010,” Interregionale Verpakkingscommissie/Commission Interrégionale de l’Emballage, which reports packaging quantities and credited recycling quantities for 2009.

VAL-I-PAC

VAL-I-PAC does not report its costs as transparently as Fost Plus does. However, based on its published membership fee rates²³ and the quantities of packaging its members place on the Belgian market according to IVCIE's annual report,²⁴ SAIC estimated that EPR for the commercial sector in Belgium costs approximately 11-12 million Euros per year.

Table 4-3 shows commercial packaging recycling and recovery (waste-to-energy) quantities.

Table 4-3
VAL-I-PAC Reported Recycling and Recovery Results

Commercial Packaging	2009		2010	
	Tonnes	Rates	Tonnes	Rates
Paper and Cardboard ²	335,269	92.8%	359,798	
Plastics	48,094	58.7%	48,925	
Glass	None reported		None reported	
Metals ³	28,597	89.7%	29,768	
Wood	87,486	59.4%	103,823	
Others	886	11.2%	886 ¹	
Total Recycling	500,331	79.4%	543,200	81.6%
Waste-to-Energy	53,135	8.4%	25,292	8.4%
Total Recovery	553,467	87.8%	716,120	90.0%

Source: "Rapport d'Activités 2010," Interregionale Verpakkingscommissie/Commission Interrégionale de l'Emballage for 2009 recycling quantities. "Rapport Annuel 2010," VAL-I-PAC, for 2010 recycling quantities.

1 Not explicitly stated in the annual report – estimate from 2009 (i.e., carried forward).

Belgium-wide Cost and Effectiveness Summary

Table 4-4 reports overall packaging recycling rates for Belgium, including packaging from both the residential and commercial generating sectors. IVCIE compiles the data shown in Table 4-4 from numerous sources, including data reported by Fost Plus, VAL-I-PAC, companies with their own approved private compliance programs (primarily for commercial packaging materials), and other packaging materials that may be recycled by municipal and private recyclers outside of the compliance programs. As Table 4-4 shows, Belgium's overall packaging recycling rate was 79 percent in 2009. Belgium's packaging recycling rate has consistently exceeded that of the other European countries, which averaged 62 percent in 2009.²⁵

²³ VAL-I-PAC 2010 fee rates for its members are €13.75 per tonne of recyclable paper containerboard, metal, and wood packaging; €37.50 per tonne of recyclable plastic packaging; and €50.50 per tonne of non-recyclable packaging.

²⁴ "Rapport d'Activités 2010," Interregionale Verpakkingscommissie/Commission Interrégionale de l'Emballage, which reports packaging quantities and credited recycling quantities for 2009.

²⁵ European Statistical Agency for the EU 27 countries (<http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=ten00063> downloaded February 21, 2012).

**Table 4-4
2009 Belgium Packaging Generation and Recycling Data**

Material	Generated (metric tonnes)	Recycled (metric tonnes)	Recycling Rate
Paperboard/Cardboard	580,879	551,652	88.0%
Plastic	285,105	118,782	43.0%
Glass	311,732	300,334	100.0%
Metals	118,848	113,117	95.4%
Wood	157,224	95,468	56.8%
Other	12,228	942	7.4%
Total	1,466,016	1,180,295	79.1%

Source: European Statistical Agency (<http://appsso.eurostat.ec.europa.eu/nui/show.do>)

The cost of producing these results as estimated by SAIC is summarized in Table 4-5.

**Table 4-5
2009 Recycling System Costs in Belgium under EPR**

Cost Element	Recycling Quantity (tonnes)	Gross Recycling Cost (millions)
IVCIE	0	€ 1
Fost Plus (packaging)	650,986	119
Municipalities (non-packaging paper collected through the Fost system)	730,000	28 minimum
VAL-I-PAC	500,332	11
Individual company compliance	28,977	unknown
Other private and municipal programs	118,396	unknown
Total	2,028,691	Over € 160

Source: "Rapport d'Activités 2010," Interregionale Verpakkingscommissie/Commission Interrégionale de l'Emballage for 2009 recycling quantities (except for the municipal paper estimate derived by SAIC). Sources of the gross recycling cost figures, before offsetting materials revenues, were discussed previously in this report section.

Note that we have included estimates for costs and recovery quantities for residential paper in Table 4-5. This was done to facilitate comparisons with North American program data because residential recycling quantities and costs for EPR programs in Canada and non-EPR program data for United States jurisdictions include residential paper in their statistics. A further analysis of the figures in Table 4-5 show that the gross cost of recycling in Belgium (before offsetting materials revenues) is over 80 Euros per tonne. If only residential recycling programs are considered (only for residential packaging and printed paper and not including organics recycling programs), the gross cost is over 107 Euros per tonne.

Ontario

Summary of Blue Box Program and Operations

One of the most well known packaging EPR programs in North America is Ontario's Blue Box program. The Blue Box Program covers all consumer packaging and printed paper that is sold in Ontario and managed in the municipal residential waste system. Materials generated in ICI settings (e.g., corrugated boxes, some beverage containers) are exempt from the Blue Box Program and are not included in program cost, generation, or recycling rate statistics.

According to Statistics Canada, residential waste is 34 percent of Ontario waste generated, and packaging and printed paper represent only a portion of residential solid waste. The overall waste diversion rate for the province including both residential and non-residential waste disposal and recycling was reported to be 22.6 percent in 2008, with about two-thirds of the total diversion quantity coming from the residential waste streams and the remaining third coming from the non-residential sector.²⁶ By comparison, the U.S. recycling rate as reported by the U.S. EPA for 2008 was 33.4 percent, which is significantly better than that of Ontario from a comprehensive total waste management perspective.²⁷

Ontario's Waste Diversion Act of 2002 provides for framework EPR in Ontario. This means the Ontario Minister of the Environment has considerable power to set targets for the Program and approve Program plans after consulting with producers, municipalities, and other stakeholders. An intermediate quasi-governmental corporation, Waste Diversion Ontario, oversees and administers all EPR programs (including those for automobile tires, electronics, and household hazardous waste products) and recovers its administrative overhead expenses from each EPR program.

The residential Blue Box EPR program has been in place since 2003 and is the principal recovery method for residential printed paper and packaging. There are also two other deposit programs that recover selected beverage containers – the Beer Deposit Program for beer containers, and the Ontario Deposit Return Program for wine and liquor containers. While the focus of this report is on the Blue Box Program, it is important to realize that some packaging (beer, wine, and liquor containers) is largely exempt from Blue Box EPR payments because they are primarily collected through other programs. Before 2007, wine and liquor containers did not carry deposits, and were managed through the residential Blue Box Program. Now, approximately 77 percent of wine and liquor containers are returned for refund and 15 percent are managed through the Blue Box program (the remaining 8 percent are disposed by consumers).²⁸ The introduction of a deposit return infrastructure has not fully exempted some level of payment to the Blue Box program for the containers that are managed through the deposit-return system.

²⁶ "Waste Management Industry Survey: Business and Government Sectors 2008," Statistics Canada, December 2010.

²⁷ "Municipal Solid Waste in the United States – 2009 Facts and Figures," U.S. EPA, December 2010.

²⁸ "LCBO Sustainability Report, 2010-2011," the Liquor Control Board of Ontario, viewed at <http://www.lcbo.com/enviro/index.shtml> on January 24, 2012.

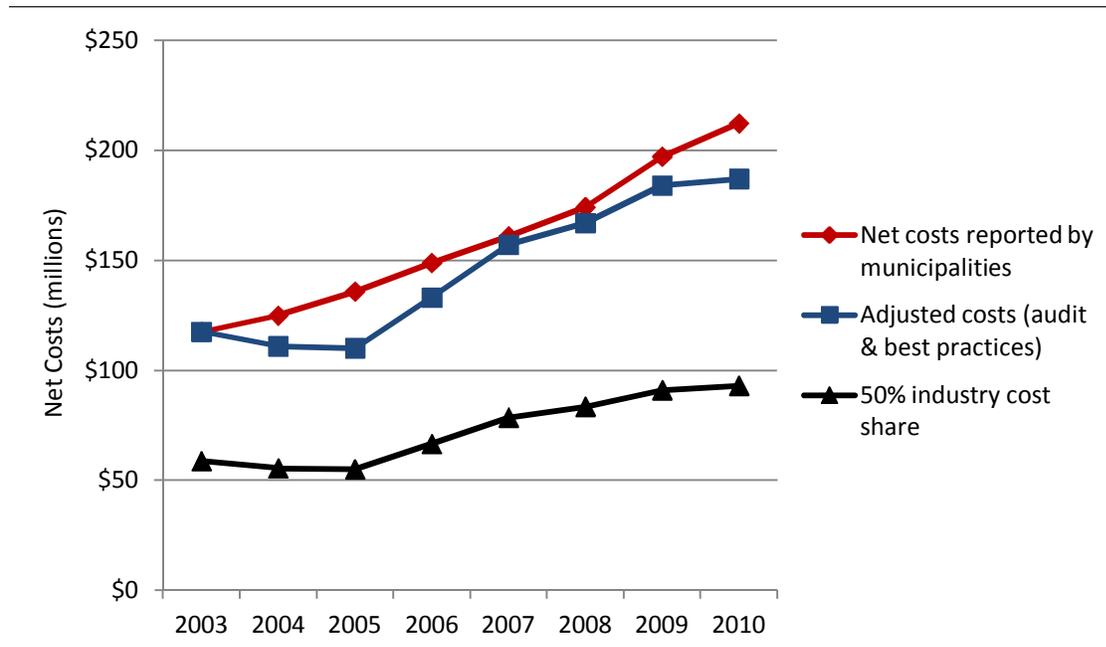
Municipalities run local Blue Box collection programs. They decide what materials to collect (they are required to collect certain materials at a minimum), provide for public education and awareness, and decide whether to use municipal workers or contract out for collection and processing services with private service providers. Processors and in some cases municipalities market the processed recyclables and use the revenues to offset program costs. Municipalities must allocate and account for all Blue Box Program costs and revenues. Net costs, after revenues, are split between the municipalities and producers, who are collectively represented by Stewardship Ontario Inc. The Ontario Waste Diversion Act assigns producers the responsibility for paying (through Stewardship Ontario) half of the net costs of collecting, processing, and marketing recyclables. Because of producers' protests over having to pay for what they attribute to be government waste and inefficiency, producers only have to pay half of what the entire system would cost if "operating under best practices," and downward adjustments are made to municipalities' costs if their programs do not have certain best-practice elements.

Stewardship Ontario does not operate, control, or make any Blue Box Program collection or processing decisions, although it must draft a program plan to meet diversion targets. Its primary influence is exerted through committee participation in the Continuous Improvement Fund, which is a provisional organization that diverts a percentage of the cost share funds from municipalities and invests those funds in projects to make Blue Box programs more cost-efficient over the long term. It also directly funds market development projects and to date has focused on funding glass and plastics processing and reclamation facilities in Ontario.

Cost and Effectiveness of the Blue Box Program

When producers began paying half the cost of recycling beginning in 2003, communities expanded their existing collection programs, added new types of materials, intensified promotion and education, and invested in capital to help divert increasing levels of materials. Currently, 95 percent of Ontario households – 5 million – have access to consumer recycling programs, of which 4.6 million Ontario households have convenient curbside recycling collection. EPR (cost share) for residential printed paper and packaging has resulted in increased recovery and from 2003-2010 the recycling rate for residential packaging and printed paper has increased from 46 percent to 65 percent. As recycling quantities have increased, so have costs. Figure 4-1 shows how total net system costs and the brand-owner cost share have increased since packaging and printed paper EPR began.

Figure 4-1
Blue Box Program Cost History

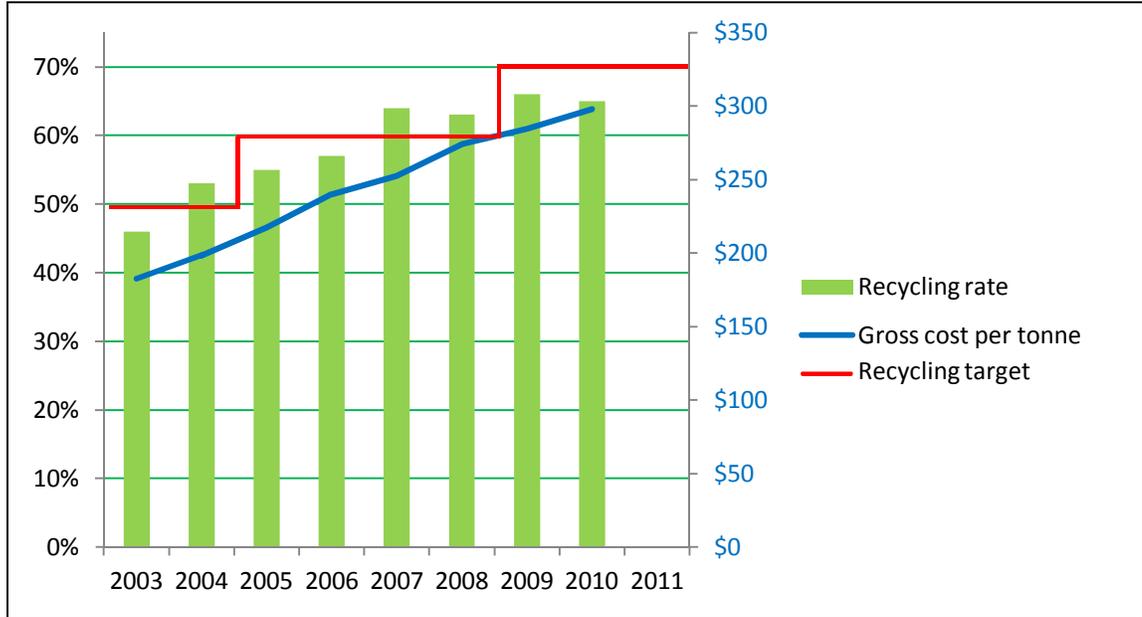


Source: SAIC, derived from Waste Diversion Ontario annual municipal Blue Box funding reports and annual financial datacall reports. Figures are shown in Canadian dollars. Net municipal costs reflect materials revenues offsets, using a three-year per-tonne average revenue factor. The industry cost share is shown for the year the obligation is incurred. In actuality, payments are delayed by approximately two years (i.e., the 2010 cost obligation is paid in 2012).

As Figure 4-1 shows, recycling costs have nearly doubled in the eight years under EPR. In 2010, municipalities' net costs were C\$212 million (~US\$210/ton based on 2010 exchange rates) and the share producers are responsible for is C\$93 million.²⁹ These cost increases are directly related to increases in the quantities of packaging and printed paper recycled by municipal Blue Box collection programs, as illustrated in the recycling rate increases shown below in Figure 4-2.

²⁹ Municipal net cost is derived from "2010 Financial Datacall Residential Blue Box System," Waste Diversion Ontario, December 14, 2011 (downloaded from <http://www.wdo.ca/files/domain4116/Residential%20Blue%20Box%20Data%20by%20Municipal%20Groups%202010.pdf>).

**Figure 4-2
Recycling Rate and Unit Cost Trends**



Note: Cost figures are in Canadian dollars per metric tonne and are shown before recovered material revenue offsets.

Figure 4-2 shows that as EPR recycling rate targets are met, new higher targets have been set. The recycling rate target for residential packaging and printed paper started at 50 percent, and was later raised to 60 percent – these targets were set as part of the EPR program planning process. More recently, in an August 2009 letter, the Minister of the Environment stipulated a new and higher 70 percent target, which he required to be met by the end of 2011. Data have not yet been received to confirm whether the target was met in 2011. The figure also shows that per tonne costs have been continually increasing (far more than inflation) from C\$182 in 2003 to C\$298 in 2010 as each additional tonne costs incrementally more to recover and recycle.

The shared-cost approach provides municipalities with an incentive to divert as much packaging and paper to the Blue Box recycling bins as possible without strong regard for cost. This is because municipalities only have to pay half the end-of-life cost for discards that are placed in the Blue Box; however, they have to pay the full cost to dispose of each tonne of discards that is set out as trash. For this reason, Ontario municipalities employ an amazing number of policies, strategies, and public communications to drive recycling higher. A number of Ontario municipalities also have added lightweight materials such as expanded polystyrene foam and film plastics to their curbside recycling programs, saving themselves landfill space and disposal costs, but driving up Blue Box programs costs without a proportional increase in tons recycled.

Stewardship Ontario, the organization that represents producers, contends that industry has been a willing partner in financially contributing to the Blue Box Program’s success and economic sustainability. However, the continuing cost increases are a concern. Stewardship Ontario has advocated for approaches to contain cost increases

and works closely with a tripartite committee comprising Waste Diversion Ontario, industry and municipalities to ensure the adoption of best practices and rigorous auditing of costs. Not every financial claim (submitted by municipalities) is accepted. A number of initiatives to contain costs and increase revenues have been tried, including:

- Using a formula to vary the payment to individual municipalities so that those with less cost-effective programs relative to peer municipalities had their funding reduced;
- Limiting producer payments to individual municipalities to what costs should be if programs were fully operating under best practices;
- Funding the development of local markets for materials such as glass and plastics; and
- Investing in tools, training, and technology to make the Ontario-wide Blue Box system more efficient and effective (formerly the Efficiency and Effectiveness Fund, now the Continuous Improvement Fund).

These initiatives have made recycling programs more efficient. However, the efficiency gains have been offset by the increased cost of additional incremental recovery. Contention between municipalities and industry over the payment of costs has resulted in a situation where neither party is satisfied with the current EPR shared responsibility approach in Ontario. Generally speaking, SAIC's observation is that producers are dissatisfied with EPR in Ontario because they do not operate programs and so have no means to manage costs. As costs continue to escalate, Stewardship Ontario has expressed that industry is willing to pay 100 percent of system costs in exchange for having full operational control. Industry would then focus on a next least cost per tonne approach (which likely would not include collecting extremely lightweight packaging such as polystyrene foam), regionalization, and other strategies. Municipalities are also generally dissatisfied because of the ongoing disagreements with producers over municipal program costs, the shifting of funds from less efficient to more efficient programs, and the retainage of "municipalities" funds that are used to pay for best practices projects that are intended to reduce long-term costs for the system. In general, many municipalities are supportive of further divesting themselves of the remaining Blue Box cost and moving from "half" EPR to full EPR.

Quebec

Summary of EPR Program and Operations

Quebec's Environment Quality Act establishes a legal obligation for target companies to financially compensate municipalities for the residential recycling programs the municipalities operate. RECYC-QUÉBEC, a provincial governmental corporation, acts as a guide, a trustee/financial clearinghouse, and an arbiter. It also certifies and works with PROs that represent three categories of designated materials ("containers and packaging," "printed matter," and "written media"). RECYC-QUÉBEC also

provides regulatory oversight of Quebec’s beer and carbonated soft drink deposit programs, which are outside of the scope of the EPR program.

The level of company contributions is set out in an annual fee rate schedule that is drafted by PROs and approved by the government of Quebec, and is based on compensating municipalities a percentage of their net costs. The total net cost share due is determined by agreement between municipal groups and PROs. Collectively, these financial agreements and schedules are referred to as a compensation plan.

EPR began on March 1, 2005, with companies responsible for financing 50 percent of the net operational costs of municipal curbside recycling programs. However, in 2010 the Environmental Quality Act was amended to increase the percentage of compensation due to municipalities to 100 percent according to the schedule in Table 4-6.

**Table 4-6
Producer Responsibility Percentages of Municipal Recycling Program Cost**

Year	% Responsibility of Costs of Municipal Curbside Recycling Programs
2005-2009	50%
2010	70%
2011	80%
2012	90%
2013 and Beyond	100%

Municipalities report the net costs of collecting, transporting, sorting and marketing recovered materials. RECYC-QUÉBEC determines, for each municipality, the cost of eligible compensatable services. An additional municipal administrative expense factor of 8.55 percent is then added to the net compensatable cost. Once the annual obligation is known, PROs develop a contribution schedule, which is first submitted to companies and organizations for comment and then to the government of Quebec (Quebec’s Ministère du Développement durable, de l’Environnement et des Parcs (MDDEP)) for approval. Each company and organization pays its contribution to the PROs according to the weight of packaging it places on the market multiplied by the fee schedule. The PROs then turn over contributions received from companies and organizations to RECYC-QUÉBEC, who acts as a trustee and distributes the compensation to municipalities. Distributions to municipalities are made according to a calculated effectiveness and efficiency factor for an individual municipal program, in comparison to the average effectiveness and efficiency of other like municipalities in the same grouping. Less effective and efficient programs receive reduced compensation. This approach provides an incentive to municipalities to implement best practices and operate efficiently.

Quebec has two PROs – Éco Entreprises Québec (EEQ), which represents producers of the “containers and packaging” and “printed matter” classes, and Recyclemédiás, which is responsible for “written matter.” “Printed matter” consists of papers and other cellulose fibres, whether or not they are used as a medium for text or images.

Examples of printed matter include advertising leaflets, catalogues, directories, annual reports, securities prospectuses and printing paper. Recyclemédiás represents over 500 publications, or “written matter,” that includes newspapers, magazines, periodicals or any other similar written matter which are (1) sold or offered free of charge; (2) published at fixed intervals and at least once a year; and (3) published mainly to deliver opinions, news or comments on current affairs or on a particular subject or theme.

Cost and Effectiveness of EPR-Funded Municipal Recycling Programs

RECYC-QUÉBEC’s allowance for the cost of regulating packaging and printed paper EPR is limited to C\$3 million by regulation. In addition to this regulatory cost, there are administrative costs of the two certified PROs and the cost of municipalities to operate their residential recycling programs.

Recyclemédiás EPR administrative expenses for 2010 were C\$0.2 million.³⁰ EEQ administrative costs for 2010 were C\$4.1 million, and audited net municipal costs (after offsetting recovered materials revenues) to operate residential recycling programs for packaging and printed paper totaled C\$138.3 million in 2010 (an additional formulaic cost allocation for municipal administration, capital, and promotion/education of 8.55 percent of compensatable costs totaled C\$10.8 million).³¹ Based on these figures, the total cost of the Quebec EPR system in 2010 was at least C\$156.4 million.

The most recent year for which published statistics on the effectiveness of municipal recycling programs for packaging and printed paper was 2008 and totaled 608,000 metric tonnes; however, there were 91,000 tonnes included in that figure from small businesses, so the total residential tonnage quantity was 517,000 metric tonnes.

Ramsey County Minnesota

Summary of Program

In order to provide an opportunity to compare the results for a non-EPR U.S. recycling system to that of the residential EPR programs in the Canadian provinces and Belgium, we chose to profile the residential recycling systems in Ramsey County, Minnesota. Ramsey County and its municipalities have an effective recycling system for residential paper and packaging, as well as policies and programs that support organics recycling and recycling from the industrial, commercial, and institutional sector. Municipalities in Ramsey County provide comprehensive recycling services to all of their citizens and accept a broad range of packaging and paper. There is effective public education and awareness that supports high levels of recycling.

³⁰ “Consultation 2011” presentation, Recyclemédiás, November 2011.

³¹ “Report on the Development of the 2010, 2011 and 2012 Schedules of Contributions and on Consultations with Companies and Organizations,” Éco Entreprises Québec, January 2012.

Important to this study and a key reason why Ramsey County was chosen to be profiled is the fact that the County has good cost and recovery data for municipal recycling systems that is isolated from other waste system cost and recovery data.

Ramsey County, Minnesota is one of the 11 counties in the Minneapolis – Saint Paul Metropolitan Area. It spans approximately 170 square miles and has a population of 508,640. The county is considered an urban area.

Ramsey County includes the following municipalities:

- Arden Hills
- Mounds View
- St. Paul
- Blaine
- New Brighton
- Spring Lake Park³²
- Falcon Heights
- North Oaks
- Vadnais Heights
- Gem Lake
- North St. Paul
- White Bear Lake³³
- Lauderdale
- Roseville
- White Bear Township
- Little Canada
- Shoreview
- Maplewood
- St. Anthony

In most municipalities in Ramsey County, single-family households subscribe for trash collection service with the hauler of their choice. The cities, however, contract for the collection of recyclables with private haulers in the region. The type of recycling collection service varies among dual stream, single-stream, and multi-sort, but collection is generally weekly. Eureka Recycling provides curbside recycling to residents of St. Paul, the largest community in Ramsey County, as well as Roseville, the second largest (combined, these two communities comprise 63 percent of the county’s population). Eureka provides dual stream curbside recycling (fibers separate from containers) and also collects bagged textiles at the curb. The material types collected in each stream are listed in Table 4-7.

**Table 4-7
Typical Materials Collected Curbside in Ramsey County Residential Recycling Programs**

Paper Stream	Container Stream	Textiles
<ul style="list-style-type: none"> ■ Newspapers and inserts ■ Magazines and catalogs ■ Cereal and other food product boxes (chipboard) ■ Mail ■ Shredded paper ■ Corrugated cardboard ■ File folders ■ Notebooks ■ Gift bags ■ Phone books ■ Pizza boxes 	<ul style="list-style-type: none"> ■ Metal food cans ■ #1 and #2 plastic bottles ■ Glass bottles and jars ■ Cartons, juice boxes, aseptic packages 	<ul style="list-style-type: none"> ■ Linens and other home textiles ■ Shoes ■ Clothing ■ Belts

³² Spring Lake Park is primarily in an adjoining county, but extends partially into Ramsey County.

³³ White Bear Lake is primarily in Ramsey County but a small portion extends into Washington County.

Most multi-family housing units are provided with recycling opportunities as well – typically on-site, with containers collected separately from fibers. Many communities also provide drop-off recycling centers for residents that accept standard curbside recyclables as well as other materials.

Activities that support the achievement of high recycling levels include:

- Minimum required levels of service for residential recycling, which include:
 - At least every-other-week collection of four broad types of material.
 - Universal recycling collection to all residents – this includes residents of multi-family buildings, which each municipality ensures through either direct service provision or regulatory means.
- Long-term funding mechanisms in place to support recycling. This includes:
 - State grant funds.³⁴
 - A Recycling Market Support Fund to mitigate some of the market price risk faced by municipalities in collecting and marketing recyclables.
- A Solid Waste Master Plan that includes significant policy direction on recycling.
- Public spaces recycling opportunities at all Ramsey County facilities including county buildings, parks, beaches, golf courses and ice arenas.
- Promotion of recycling at private commercial buildings through:
 - County Environmental Challenge – an initiative to increase recycling in businesses, schools and institutions.
 - Green Gatherings Initiative – a public/private partnership to enhance recycling at events.
- Cooperative focus on organics recycling between Ramsey and Washington to provide outreach services and information to organics-rich businesses and institutions.
- Extensive promotion, education, and outreach led by the County using the following methods:
 - Electronic media – Including a county website, Twitter, Facebook and YouTube accounts.
 - Telephone hotline.
 - Print materials – Calendars, post cards, and bill inserts produced by the county and distributed through municipal/local government offices, festivals and events, solid waste haulers and transfer stations, new resident packets, community cleanup events, employers, HHW and yard waste sites. Materials have been developed in Somali, Spanish, and Hmong to reach as many citizens as possible.

³⁴ The Minnesota Pollution Control Agency has provided Select Committee on Recycling and The Environment grants (SCORE Grants) since 1990. SCORE grants ensure that all communities have at least sufficient funding to provide a minimal level of service for residential recycling.

- Presentations – the County presents to a variety of audiences including schools and community organizations.

Cost and Effectiveness of County and Municipal Programs

Ramsey County estimates that 630,000 tons of MSW are generated countywide, including all municipalities and the commercial and residential sector combined, and that 46.7 percent is recovered for recycling (excluding yard debris). Because waste collection for either residential or commercial waste is not organized by the County, it does not have data regarding the breakout between residential and commercial waste; therefore, it is not possible to accurately estimate separate residential and commercial recycling rates.

Local governments in the county, however, organize recyclables collection, and there is reliable recycling data that is collected and reported. SAIC summed data for the amount of recyclables reported by the communities for 2011. The residential sector is estimated to have recycled 41,679 tons of MSW in 2011 (excluding organics collection), or 164 pounds per person.

All Minnesota communities provide data to the Minnesota Department of Pollution Control using the ReTRAC system. Data includes tons recycled, as well as costs of recycling, including collection costs, administrative staff costs, costs associated with collection, processing, education and outreach, and capital costs (e.g., typically for collection containers). Communities also report revenues received for the sale of materials, grants, and other revenues. From this reported data, SAIC was able to estimate gross and net costs of providing residential recycling by subtracting revenues earned on the sale of materials from the sum of all costs. In 2011, the communities in Ramsey County indicated that their net cost of providing residential recycling was \$6,510,493. This equates to an average of \$156.21 per ton.

Section 5

NON-EPR POLICY MECHANISMS

Non-EPR Policy Mechanisms

Public policy can be generally defined as a system of laws, regulatory measures, plans (including permits and approvals), and funding priorities. EPR is one public policy mechanism, but there are other policy mechanisms that can help programs fulfill the ultimate objectives cited by those who advocate for EPR, including the objective to achieve higher recycling rates, often at reduced cost.

EPR as a policy mechanism is normally only feasible on the state or national level. Non-EPR policies, however, can be introduced from numerous levels of government, including national, state, and local levels. Local policy options that normally cannot be required by upper level government include:

- **Automatic recycling enrollment** – Recycling service is not an electable service option – the service and its cost must be provided to all customers.
- **Disposal limits** – Single-family residences are limited in the quantity they are allowed to dispose of, or similarly waste collection service levels are scaled back – e.g., a limitation of 3 bags of waste per week, or a scaling back from twice weekly to once weekly waste collection. This policy can drive generators to divert more materials from waste disposal to recycling.
- **Recycling rewards or rebates** – Customers who recycle receive rewards points or a rebate on their bill.
- **Waste collection cessation** – This local policy may be an important policy that supports a disposal ban, and entails not collecting waste if it contains mandated recyclables or products banned from disposal facilities, until the generator removes the recyclable materials and complies with the other policies.
- **Penalties** – Assess a disposal penalty or surcharge where recyclables are not being separated for recycling above minimum threshold levels. This can provide an incentive to multi-family complexes complex managers to educate and inform residents of the requirement to recycle, ensure parallel collection convenience for recyclables and waste, and ensure sufficient recycling collection container capacity. It can also be effective for commercial generators.

In addition to these local policies, there are a number of policies that can be required by state governments. These state-level policies can have significant impacts because they can affect the entire populations of states, if implemented (some of these policies can also be independently implemented by local governments as well). A list of policies that can be required by state governments includes:

- **Pay-as-you-throw disposal pricing** – Pay-as-you-throw (PAYT) disposal pricing means that a waste generator pays more when higher levels of waste are disposed than when lesser quantities of waste are disposed. PAYT provides an incentive to

consume less and divert materials to recycling. While PAYT pricing is standard for bulk collection of waste from commercial buildings, residents of single and multi-family homes most commonly pay a flat rate regardless of the quantity of waste that they individually dispose. There are three states with PAYT residential waste policies – Minnesota, Oregon, and Washington – and PAYT programs cover all residents of those states. Studies have shown that residential MSW recycling rates increase by five to six percentage points when PAYT is implemented, not including additional diversion that comes from yard waste.³⁵

- **Disposal ban** – Specified items are banned from direct-to-landfill disposal. For example, North Carolina bans the following packaging materials from disposal: wood pallets, aluminum cans, plastic bottles, and alcoholic beverage containers from bars and restaurants. Similarly, Wisconsin has banned newspapers, magazines, corrugated cardboard, container board, non-residential office paper, and all types of metal, glass, and plastic containers from landfill disposal. Disposal bans by themselves are ineffective without a collection and processing infrastructure, supporting local policies, and generator education.
- **Mandatory recycling - materials** – Policies can make it mandatory for generators to separate certain materials for recycling, and for recycling service providers to include the specified materials in collection programs. Florida and Pennsylvania require the recycling of some common household recyclables and nine states including New Jersey, Pennsylvania, Rhode Island, and others require the recycling of corrugated containers.
- **Mandatory recycling - service levels** – Service level standards that meet certain minimum criteria have been demonstrated to result in higher diversion rates. Such criteria may include:
 - Minimum community population above which curbside recycling collection must be provided;
 - Minimum requirements for drop-off sites (number of sites per thousand population, distance to nearest sites);
 - Requirement to provide commercial and multi-family recycling collection;
 - Minimum collection frequency (e.g., no less than every other week);
 - Collection style (e.g., “single stream” collection of household residential recyclables);
 - Requirement to provide collection service and/or collection containers (e.g., bins, carts, or containers) for no additional user fee;
 - Minimum recycling education requirements.

California’s Assembly Bill 341, enacted in 2011, requires businesses to arrange for recycling services and for recycling service to be provided to residents of multi-family dwellings. Delaware passed a law in 2010 that specifies the frequency of

³⁵ “Measuring Source Reduction: PAYT/Variable Rates as an Example,” Skumatz Economic Research Associates, Inc., May 2000.

residential recycling collection (no less than every other week), that collection must be single stream, that all single and multi-family homes must receive curbside collection, and that recycling containers must be provided at no additional cost.

- **Recycling program management** – This policy requires that municipalities, counties, regions, states, or retailers establish programs to collect, recover and recycle covered products. Programs may be required to have staff, conduct public outreach, reporting, and program planning. South Carolina and Pennsylvania require that counties have recycling coordinators, who plan and help to manage recycling programs.
- **Integrated solid waste management plans** – This policy requires that a county or regional waste management division develop a solid waste management plan. It may require a regional planning approach and submission of plans to state agencies for approval. Georgia, South Carolina, Pennsylvania, and Minnesota, for example, require counties or regional planning authorities to develop and submit integrated solid waste management plans, with descriptions of goals and programs for the diversion of a variety of products.
- **Diversion goals (recycling and energy recovery)** – Goals may include both recycling and landfill diversion (including energy recovery). Goals provide benchmarks for local authorities to design programs to and so are important. Packaging recovery goals in the European Union include a minimum recycling component combined with a higher overall recovery rate goal that includes energy recovery. A number of U.S. states have recycling goals for municipal solid waste. In 2011, California raised its mandatory 50 percent diversion rate requirement for municipalities to an aspiration goal to divert 75 percent of MSW from disposal. California reported a 53 percent diversion rate for MSW for 2008, the highest of any U.S. state. Apart from waste diversion goals, state or federal energy policies can also provide incentives that lead to higher diversion of discards. A renewable portfolio standard (RPS) is a state policy that requires electricity providers to obtain a minimum percentage of their power from renewable energy resources by a certain date. Currently there are 24 states plus the District of Columbia that have RPS policies in place and together these states account for more than half of the electricity sales in the United States.³⁶ However, most RPS do not currently include discarded packaging materials in their definitions of renewable energy.
- **Landfill surcharge/tax** – Some 34 U.S. states have disposal tip fee surcharges that disposal facilities (landfills, waste-to-energy facilities, waste transfer stations) must submit. Such surcharges make waste disposal more expensive, which provides an economic incentive to divert waste (diversion facilities are typically exempt from the surcharges); however, high surcharges can also result in transfer of waste to landfills in surrounding areas. The proceeds from tip fee surcharges are used in any number of ways, but most often are used to fund state agency diversion programs and provide for grants to local government programs. Only in one U.S. state does the surcharge exceed \$10 per ton (Wisconsin). In most other U.S. states,

³⁶ http://apps1.eere.energy.gov/states/maps/renewable_portfolio_states.cfm referenced on December 8, 2011.

the surcharge is low, providing only a limited diversion incentive. Alternatively the surcharge is very high in a number of European countries, which provides an effective economic incentive to divert waste from disposal, especially from the ICI sector, including C\$95-119 per tonne in Belgium, C\$100 per tonne in Denmark, C\$138 per tonne in Austria, and C\$142 per tonne in the Netherlands as reported in a Province of Ontario document.³⁷

- **Advanced recycling/disposal fees** – An advanced recycling fee (ARF) or advanced disposal fee (ADF) is charged to the consumer when they purchase an item. Funds so raised can support private and/or local government collection infrastructure, provide diversion incentives, pay for the transportation and processing of collected materials, or fund market development. ADF/ARFs can also provide stable funding, or additional funds if needed to achieve higher diversion levels, and so can more sustainably fund diversion programs than government taxes and fees do. ADF/ARFs can achieve all of the policy objectives of EPR, except that they do not generally involve producers and so are not capable of providing feedback for product/package redesign. ADF/ARF fees are commonly applied to specific products such as automobile tires and batteries. Florida had a broad ADF for packaging containers in the mid-1990s; however, it was not administered well, was unpopular with consumers, and failed to impact recycling rates, and so was allowed to quickly expire after its trial period. ARFs have become common in a number of Canadian provinces where there are deposits on beverage containers. In those provinces, consumers are charged a refundable deposit on the container, plus a non-refundable container recycling fee that pays the cost of operating the beverage container redemption program.³⁸
- **Recycling infrastructure/program grants** – Grants from state governments to local agencies have proven effective in building infrastructure for diversion, developing markets, funding continuous improvement, or funding ongoing recycling program management (e.g., recycling coordinator staff positions and ensure the reporting of program data), and in some cases providing ongoing collection program support. A funding source (e.g., the disposal tip fee surcharge discussed previously) is needed to support grant programs.
- **Mandatory retail take-back** – Retailers can be required to take back certain types of packaging that is difficult to manage in traditional collection programs. For example, California and New York require retailers to take back retail carryout bags and sacks for recycling. Other states require automobile service and parts stores to take used oil. This policy is generally not popular with retailers because their primary business is not recycling or waste management.
- **Building design standards** – Policies that require buildings to be designed with space for recyclables collection containers can support multi-family and

³⁷ “From Waste to Worth: The Role of Waste Diversion in the Green Economy,” Ontario Ministry of the Environment, October 2009

³⁸ According to “Who Pays What,” CM Consulting, May 2010, provinces where ARF fees (or some other variation of them) are charged on deposit beverage containers include Alberta, British Columbia, New Brunswick, Newfoundland, Nova Scotia, Prince Edward Island, and Saskatchewan.

commercial recycling of packaging and paper materials. Such policies are in place in California and Florida.

- **No direct landfilling of waste** – The European Community Landfill Directive requires that waste be processed prior to landfilling (waste-to-energy is within the definition of processing, as are activities to remove and divert products and materials before land disposal). There is no similarly broad requirement in any U.S. state or Canadian province, although both Florida and Massachusetts require construction and demolition debris to be processed before disposal. A number of cities and counties perform mixed waste processing as a waste management strategy, but not because a policy requires it. This policy mechanism has the potential to significantly increase the recovery of materials from municipal solid waste.

All of the policies in this section can support achieving higher recycling rates. However, a couple can also address other objectives of those who advocate for EPR. For example, policies that result in those who consume more paying more include PAYT, advanced recycling fees/advanced disposal fees, and retail take-back. State grants that fund infrastructure efficiency improvements and market development can also make recycling systems more efficient and reduce cost. The other policies in this section generally are not effective in causing producers to design for the environment, but neither is EPR, as demonstrated in Section 2.

Cost and Effectiveness of Non-EPR Policy Mechanisms

This section listed a number of government policies with the ability to contribute to achieving high recycling rates; however, it is not a comprehensive list of policies that can be considered, nor are the specific contributions of individual policies well understood in most cases. Furthermore, SAIC concurs with the following conclusion from a European study:

“In general it appears that a combination of policy instruments is required to divert waste from landfills effectively. Economic instruments such as user charges for the management of municipal waste (e.g. 'pay-as-you-throw' schemes), landfill tax and product charges can have a significant role if designed to regulate the behaviour of households, waste companies and producers.”³⁹

The investigation of Ramsey County that was performed for this study found that the following policies were in place there:

- Automatic recycling enrollment;
- Pay-as-you-throw disposal pricing;
- Mandatory recycling – materials (e.g., at least four broad classes of materials, such as paper/cardboard, metal, plastic, glass, textiles);

³⁹ “Diverting Waste from Landfill: Effectiveness of Waste-Management Policies in the European Union,” European Environment Agency, 2009.

Section 5

- Mandatory recycling – service levels (e.g., at least other week collection, collection services provided to multi-family and commercial businesses, etc.);
- Recycling program management;
- Solid waste management plan (integrated with the state and Twin Cities regional plans);
- Recycling infrastructure/program grants (i.e., SCORE grants); and
- Building design standards to accommodate recycling collection containers.

As the previous section that profiled Ramsey County indicated, Ramsey County has achieved an MSW recycling rate of 47 percent through a combination of these policies, effective public education, and well-run programs. When credits for yard waste management and waste prevention are included, Ramsey County is credited with an overall 55 percent recycling rate. This has been accomplished at a net cost of \$156 per ton for residential recycling packaging and paper recycling programs.

States that have required many of these policies on the state level also have achieved high recycling/diversion rates. Examples include Minnesota with 43 percent statewide recycling rate,⁴⁰ and California that reported a 65 percent landfill diversion rate for 2010.⁴¹ As was mentioned previously in this report, U.S. statewide cost figures that can be compared directly to those of EPR countries or provinces are not available.

⁴⁰ “Report on 2010 SCORE Programs,” Minnesota Pollution Control Agency, December 2011. This report also indicates that Minnesota combusted over 18 percent of municipal solid waste in waste-to-energy plants, for an overall landfill diversion rate of 62 percent.

⁴¹ As reported at <http://www.calrecycle.ca.gov/LGCentral/GoalMeasure/DisposalRate/Graphs/EstDiversion.htm>, June 2011. California does not calculate a direct recycling rate *per se*. Instead, it calculates a diversion rate that includes recycling and the diversion of discards to uses such as landfill alternative daily cover.

Introduction

Advocates for EPR recite a large number of reasons why EPR should be considered a preferred policy approach for the end of life management for packaging and printed paper. These arguments ultimately condense into the following four asserted effects:

1. EPR causes producers to change packaging design and selection, leading to increased recyclability (higher recycling rates) and/or less packaging use.
2. EPR provides additional funds for recycling, resulting in higher recycling rates.
3. EPR improves recycling program efficiency, leading to less cost, which provides a benefit to society.
4. EPR results in fairer system of waste management in which individual consumers pay for their own consumption, rather than general tax payers.

The primary arguments for packaging EPR, at least in the United States, involve the first two assertions, which if proven true, would provide ultimate outcomes of less land use for landfilling, less emissions of carbon dioxide and other gases with global warming potential, less pollutant emissions, and sustainable resource utilization.

EPR's Influence on Package Design and Selection

With respect to the first assertion that EPR results in packaging changes by producers, advocates most often point to economy-wide data from Europe that on its face seems to indicate a “decoupling of packaging from GDP growth.” We examined the same data for the United States over the same time period as that from Europe and found that packaging use grew less in the U.S., where there is no packaging EPR, than in Europe, where there is packaging EPR, despite the fact that the U.S. had a higher GDP growth rate. Furthermore, detailed packaging choice case studies for specific products (beverages, snacks, and ground coffee) in three locations where there is packaging EPR (Belgium, Germany, and Ontario) further demonstrated that EPR, at least for the package formats and jurisdictions investigated, does not provide a price signal that is sufficiently differentiated to cause producers to change package formats. In summary, we found no evidence to support the assertion that EPR causes changes in package design or selection.

EPR's Influence on Achieving High Recycling Rates

With respect to the second assertion we found that jurisdictions with EPR may achieve high recycling rates for the narrow portion of total discards covered by EPR (e.g., 62 percent of packaging is recycled in Europe, and in the Canadian provinces with EPR

packaging and paper recycling rates range from 65-68 percent, but only for the residential sector since non-residential materials are not covered by EPR programs). By comparison, the recycling rate for packaging in the United States in 2010 was 48 percent, and when printed paper is included (as in Canadian EPR), the packaging and paper recycling rate in the United States is 52 percent, including both residential and commercial sectors. However, from a more comprehensive perspective that examines overall municipal solid waste recycling rates, the United States (where there is no packaging or paper EPR) performs just as well or better than Canada and Europe. The United States had a nationwide recycling rate of 24 percent in 2008, exceeding the recycling rates of Canada at 18 percent (where a majority of the population is covered by EPR), and the 27 European Union countries covered by packaging EPR, who recycled 23 percent of their municipal solid waste.

EPR's Influence on Enhanced Efficiency and Reduced Cost

The third assertion, occasionally made by advocates of EPR but not explicitly cited as an objective in EPR laws themselves, is that EPR will result in more efficient programs, ultimately saving consumers cost. By its nature, as a government mandate placed on industry, EPR results in three specific areas of cost increases that may not be offset by efficiency improvements. These three areas of cost increases are:

- Increased government cost increases to regulate producers, plus administrative cost increases accrued by producer responsibility organizations (i.e., costs associated with staff, administration, obtaining stakeholder input, registering companies, fee collection/payments, data gathering/monitoring, and reporting to prove compliance with laws). The cost increases associated with government agencies and producer responsibility organizations for the EPR jurisdictions examined in depth for this study ranged from 2.4 percent to 4.6 percent of total system cost.
- Increased administrative costs accrued individually by regulated producers to participate in stakeholder meetings, track and report quantities of regulated packaging, and calculate and remit payments, for the over 35 global locations where there is packaging EPR. EPR obligations differ in each of these locations and the total administrative cost of compliance incurred individually by all obligated companies, while not documented, is not trivial.
- Increased taxation. Most locations in the United States have a state and/or local retail sales tax; however, services may not be taxed. When the cost of providing the recycling service is shifted from a municipal budget or untaxed utility bill and incorporated into the price of products that are subject to a retail sales tax, the effect is a tax increase to consumers. According to the Sales Tax Clearinghouse, average combined state and local sales taxes range from zero in Delaware, Montana, New Hampshire, and Oregon to 9.45 percent in Tennessee – the national average sales tax rate is 6.8 percent.⁴²

Although full system cost and performance data for EPR is generally not available or reported, SAIC attempted to compile data that could be compared for a select number

⁴² <https://thestc.com/FAQ.stm>

of jurisdictions, considering the resources available for this study. These jurisdictions included Belgium, because it is a high-performing European country and often viewed as a model for EPR, and the Canadian provinces of Ontario, Manitoba, and Quebec, because as North American neighbors, they have much more in common with U.S. states than do other jurisdictions. Section 4 provided an in-depth analysis of each of these jurisdictions.

Table 6-1 on the following page provides a summary of the cost and effectiveness (recycling levels) of packaging and printed paper under EPR for the jurisdictions examined in depth for this study, but only for the residential sector since that is the only sector currently covered by packaging EPR in North America. The table also includes a high performing U.S. county, Ramsey County Minnesota, for comparison. Unfortunately, SAIC is not familiar with any comprehensive study or database on the U.S. national level, or for all municipal programs in a state, that has allocated cost and recovery quantities of residential recycling programs for packaging and paper. A large percentage of municipalities include the cost of service for residential packaging and paper collection with that of yard waste collection, and/or with that of solid waste collection, in municipal service contracts. Furthermore, the vast majority of contracts for processing residential packaging and paper recyclables embed materials revenues into service fees (at varying levels of revenue sharing) so that it is nearly impossible to determine full system costs without the effect of materials revenues on service price.

As can be seen from the table's comment column and the table notes, extensive analysis was required to arrive at estimates that could be compared. This included deriving estimates of costs and recovery quantities for printed paper in Belgium, which is not subject to EPR, so that it could be compared to data for Canadian programs where printed paper is included (furthermore, discussions regarding EPR in U.S. states usually include printed paper).

As Table 6-1 shows, residential recycling in Belgium is very effective and appears to operate efficiently under EPR. However, it is not clear how much of an effect unique Belgian social/geographic factors (such as high population density), government waste policies, and waste infrastructure factors that are not applicable to the typical U.S. state may have had on its cost-effectiveness. Unlike the Belgian experience, packaging and paper EPR in the Canadian provinces that have EPR has proven to be expensive. SAIC considers the experience in Canada to be much more applicable to what the cost-effectiveness in U.S. states may be, rather than that of Belgium, due to the similarity between Canada and the United States. By comparison, non-EPR Ramsey County recovers more materials (on a per capita basis) for less cost than the Canadian EPR programs.

For the case study jurisdictions examined by this study, especially those in Canada that are most applicable to the United States, it does not appear that EPR has reduced total system cost or the cost to the consumer. Furthermore, U.S. consumers' costs may increase to the extent that the cost of recycling services is not currently taxed, but would be taxed once embedded in products that are covered by retail sales taxes.

**Table 6-1
Summary of Program Cost and Performance for Residential Sector Programs**

Jurisdiction	Start Date	Data Date	Program Cost	Recovery	Net Cost (US \$/Ton) ¹	Comments
EPR Programs						
Belgium	EPR-1997	2009	€119.1 million Fost Plus €0.5 million IVCIE (half of total allocated to residential packaging) and minimum €28 million municipal cost estimate for paper (not covered by EPR but included for comparison purposes) minus estimated Fost Plus and municipal paper revenues of €35.3 million, or a minimum net cost of €112.3 million	<ul style="list-style-type: none"> • 650,986 metric tonnes packaging • 83.5% per IVCIE • Plus an estimated 730,000 tonnes of residential paper not covered by EPR • 282 pounds per person 	Over \$98	Fost Plus costs are based on industry contributions for model program costs. Actual program costs may be higher. Municipal paper recycling costs are estimated and may not include all costs (such as processing costs). Recovery quantities include metal packaging not collected in recycling programs but recovered from waste-to-energy plant ash. Residential paper tonnes are estimated based on Fost Plus allocation factors.
Manitoba	EPR-4-2010	2010	C\$8.7 million first year expenditures for Multi-material Stewardship Manitoba (includes C\$6.8 million paid to municipalities for 3/4 year, net of materials revenues) CBCRA expenditures of C\$1.8 million March 26, 2010-Dec. 2010. (Total annualized estimated cost of at least C\$13.7 million)	<ul style="list-style-type: none"> • 72,667 metric tonnes (full year 2010 including 3 months of pre-EPR tonnes) • 67.6% based on full-year steward tonnage reports (may not include tonnages for obligated stewards who did not report) • 130 pounds per person 	Over \$166	Steward payment responsibility under EPR began on April 1, 2010, with industry responsible for 80 percent of the cost of efficient municipal programs. Actual costs are higher. Stewards are also responsible for an enhanced beverage container recovery program with a goal to recycle 75 percent of beverage containers and reduce single-use plastic bag use by 50 percent. MMSM reported a 2 percent tonnage increase for 2010 over 2009 (no EPR). Cost per tonne estimate based on annualizing partial year costs and inflating MMSM contributions from the 80% industry cost share to estimate full costs.
Ontario	EPR-2003	2010	C\$88.8 million paid by producers of total cost of C\$203 million. ²	<ul style="list-style-type: none"> • 887,242 metric tonnes • 65% • 148 pounds per person 	\$202	All cost and recovery figures include both packaging and printed paper, but only from the residential sector.

Jurisdiction	Start Date	Data Date	Program Cost	Recovery	Net Cost (US \$/Ton) ¹	Comments
Quebec	EPR-2005	2010	C\$138.3 million net municipal cost plus, plus municipal administrative allowance of C\$10.8 plus C\$7.3 million for RECYC-QUE'BEC, Recyclemédiás, and EEQ administration costs ³ for a total system cost of at least C\$156.4 million	<ul style="list-style-type: none"> • 2008 quantity of 608,000 metric tonnes minus 91,000 commercial tonnes • 64.8% • 147 pounds per person 	Not available	SAIC was unable to obtain 2010 recycling quantities to correspond with 2010 costs; therefore, no cost per ton estimate has been calculated.
Non-EPR Comparison						
Ramsey County, Minnesota	No EPR	2011	US \$6.5 million net municipal , including offsetting materials revenues but excluding grant funds	<ul style="list-style-type: none"> • 41,679 short tons • 164 pounds per person 	\$156	Residential waste composition data was lacking – therefore a residential packaging and paper recycling rate could not be calculated.

1 Based on a conversion factor of 0.907 short tons per metric tonne, and average 2010 currency conversion factors of 1.328 U.S. dollars per Euros and 0.971 U.S. Dollars per Canadian dollar. Note that net costs can vary significantly from year-to-year due to market fluctuations for the value of recovered materials.

2 “2010 Financial Datacall Residential Blue Box System,” Waste Diversion Ontario, December 14, 2011 (downloaded from <http://www.wdo.ca/files/domain4116/Residential%20Blue%20Box%20Data%20by%20Municipal%20Groups%202010.pdf>).

3 “Report on the Development of the 2010, 2011 and 2012 Schedules of Contributions and Consultations with Companies and Organizations,” Eco Entreprises Québec, January 2012 for net municipal costs, RECYC-QUE'BEC regulatory fees, EEQ administrative expenses, and municipal administrative allowance. Recyclemédiás budgeted administrative costs are from “Consultation 2011” presentation, Recyclemédiás, November 2011.

Fairness of EPR

The fourth assertion is that EPR is inherently fairer than the standard approach of financing the cost of residential packaging and paper recycling programs in the United States. This assertion is true, although some non-EPR policies such as pay-as-you-throw can provide the same outcome (whereby individual consumers pay the cost of their own consumption) without the cost associated with EPR.

Conclusion

The crux of the debate over EPR is how cost-effective it is in comparison to non-EPR alternatives. A paper published in the Harvard Environmental Law Review provides excellent perspective:

To be comprehensive, any cost-benefit analysis of EPR should include resource benefits (avoided energy inputs and avoided virgin material use), but doing so is enormously complex. If EPR programs avoid deforestation, mining, petroleum refining, air pollution, or greenhouse gas emissions that would have otherwise preceded production of new products, how should those benefits be quantified?

Even if such benefits could be quantified, it should also be recognized that any policy instrument that stimulates recycling or subsidizes use of secondary materials could accomplish many of the same results. In other words, the issue of whether the European Union or the United States should do more to encourage recycling is quite distinct from the issue of who should pay.⁴³

Ultimately, consumers pay for the end-of-life management of packaging and paper, whether through a utility bill not under EPR or through costs embedded into the price of products under EPR. Furthermore, government policies are central to achieving high recycling rate goals because only governments can require and implement policies such as landfill bans, disposal surcharges, etc. Alternatively, industry, even if in full control of recycling programs under EPR, lacks the legal authority to do so.

This study found that U.S. communities and states that have implemented non-EPR policies can achieve high recycling rates. For example, in this study we profiled Ramsey County with its 47 percent overall recycling rate (55 percent when yard waste is included), which was achieved at a reasonable net cost of \$156 per ton for residential packaging and paper recycling. We also found that certain states that make extensive use of government policies can also achieve high overall MSW recycling rates (e.g., Minnesota at 43 percent and California with a reported landfill diversion rate of 65 percent), all addressing more comprehensive portions of the municipal solid waste stream than residential paper and packaging EPR, without its associated costs.

⁴³ “Planning the Funeral at the Birth: Extended Producer Responsibility in the European Union and the United States,” Harvard Environmental Law Review, August 2006.